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# **A SURVEY METHODOLOGY FOR CONSERVATION AND RECONVERSION OF FUNCTIONAL BUILDINGS AFTER 1950**

## **Dissertation**

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by

Laura Nardi

born 12.10.1987

from Spoleto, Italy

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Professorial advisors

Prof. Alexander von Kienlin

Prof. Paolo Belardi

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a Mattia



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## *Abstract*

The **main purpose** of the research is **to furnish a methodology of analysis** for designers who have to face the restoration and the refurbishment **of functional buildings** (buildings strictly connected to their function), realized in the twenty years after the Second World War and that are now disused and at risk to be changed. The analysis is led starting from the architectural survey looking for, through accurate measurements and in-depth studies, the design intent, the recurring elements (typological characters, materials, constructive techniques) and the resistance of materials over time. **The aim is to understand the substance, the essence and the significance of the buildings** expressed through the main characteristic elements that should be preserved in the eventuality of a future change or transformation. **The peculiarity and the novelty** of the research consist of identifying the distinctive elements through **a practical analytical procedure based on a scientific method** which takes into account all the influences and the factors necessary to deeply understand the essence of the buildings and **which can be applied to buildings of the same type in other European contexts**. The work is **built upon a specific case study** (the Double Institute for Piston Engines of the Braunschweig Technische Universität, designed by Walter Henn in 1961), exemplifying of the typological-historical field which is being investigated. The analysis output is **in the form of sheets** and it is **applied to a second case study** (the Anatomical-Surgical Academy of the Perugia University, designed by Giuseppe Nicolosi in 1971). The **sheet work** is thus verified and **generalized** so that it can be applied to further functional buildings in other contexts, becoming a useful instrument for professionals and academics.

## 1. Introduction

### 1.1 Reasons and overview of the thesis

With this thesis the intent is to furnish a useful instrument to designers who have to face the restoration and the refurbishment of modern buildings (realized in the second half of the twentieth century) through a practical analytical procedure which takes into account all the influences and the factors necessary to deeply understand the essence of the buildings so that the peculiar and identifying characters can be preserved.

This work fits in the line of research launched by Prudon, who for one searches for a methodology for protecting modern architecture, identifying what peculiarities differentiate the investigation of a recent building compared to the investigation on historical buildings.<sup>1</sup> Prudon questions the way for taking into account the **architect's intent** and the **building's significance**, that for the most recent architecture constitute fundamental aspects to be investigated, and the way for choosing the parameters which make possible to establish what it takes to be preserved.<sup>2</sup> In fact, he writes that there are three reasons why for modern architecture the original design concept is so important: "the prominence of the role of the designer as the primary creator; the dominance of manufactured, standardized materials and components over handcrafted ones; and, as a result of the first two, the ascendancy of overall design over the work of individual artisans."<sup>3</sup> Prudon illustrates that: although the analysis level of detail of any object, belonging to any historical period, depends on the reason why the analysis is carried on; given that some surveys are anyway basic (as for example the architectural survey and the investigation on materials); when an architecture of the 20th century is faced, it is necessary to consider further important aspects which can be traced just for

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<sup>1</sup> For a complete reading of the Prudon thought, see Prudon, Theodore H. M.: *Preservation of Modern Architecture*. John Wiley & Sons, New Jersey 2008. The main points of his thought, taken as the basis of this thesis, are explained in the following text.

<sup>2</sup> Prudon 2008, pp. 35-37, 44-47. The first definition of significance can be found in the Burra Charter, adopted in Australia in 1979 by Australia ICOMOS. According to the definition 1.2, *Cultural significance* means: "aesthetic, historic, scientific, social or spiritual value for past, present or future generations. Cultural significance is embodied in the *place* itself, its *fabric*, *setting*, *use*, *associations*, *meanings*, *records*, *related places* and *related objects*. Places may have a range of values for different individuals or groups."

<sup>3</sup> Prudon 2008, pp. 35. The origin of this thought can be found in the conservative principles of the DOCOMOMO international organization: it was the first who "specifically argued in favour of design authenticity over material authenticity" (as explained in McDonald, Susan: *Materiality, monumentality and modernism: continuing challenges in conserving twentieth-century places*. Getty Conservation Institute, Los Angeles 2009, p. 1).

so recent architectures. The investigation cares, in fact, about the most intangible aspects concerning the designer's ideals and objectives that, because of their feature of immateriality, are difficult to investigate as well as to criticize.<sup>4</sup>

**The contribution that this research intends to introduce is a proposal for a practical procedure** which is conceived for buildings realized in the second half of the Twentieth Century (in particular in the 1950-1970) offering a strategy which could be easily applied by professionals who have to plan an intervention of restoration. Starting from the indications provided in the Prudon's methodology, **a procedure of analysis is determined**, that is based on a holistic approach, concerning a particular case study, and that is **organized in the form of sheets** which allows an easy identification and organization of all the aspects to be investigated. The procedure is addressed in particular to all that buildings whose architectural, technical and structural features are dependent on, and have been designed for, a specific function. The aim is to furnish **an instrument that can facilitate to understand what elements of the building deserve to be preserved, in the case of any change.**

The work arises from the interest in the recent history of a specific building (the Institute for Piston Engines in the Technische Universität Braunschweig) subjected, during the three years of the thesis development, to a radical transformation which has been possible to follow closely.<sup>5</sup> The project of transformation has concerned the re-

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<sup>4</sup> It is by now a shared view that the condition of authenticity of a modern building to preserve, isn't just ensured by the preservation of the original materials, but rather of the original idea. This assumption differs from the theories of conservation of the architectural heritage (from John Ruskin and Viollet-le-Duc to Camillo Boito, Gustavo Giovannoni and Cesare Brandi). With regard to this concept, see in particular Prudon 2008, pp. 156-159 and McDonald, Susan 2009. See also Bak-Andersen, Søren: How choice of Material is Balanced between Notions of Authenticity and Technical Know-how, in: Tostões, Ana. Ferreira, Zara (eds.): Proceedings of the 14<sup>th</sup> International Docomomo Conference. Adaptive Reuse – The Modern Movement Towards the Future. Docomomo International. Casa de Arquitectura, Lisbon 2016, pp. 623-628 according to which the authenticity of a building is given by its notion and idea, instead of the original craftsmanship; Pellegrini, Ana: Beyond Materiality: Design as Heritage, in: Tostões, Ana. Ferreira, Zara (eds.) 2016, pp. 747-753 according to which, being the design the real heritage of a building, the imitation of the building even with new materials is it possible; Perkkio, Mia: Integrity and Authenticity when Restoring and Reusing Modern Heritage, in: Tostões, Ana. Ferreira, Zara (eds.) 2016, pp. 741-746 according to which: "The main challenge in the reuse of modern heritage is not that of finding technical solutions, but of responding to the needs of society through an understanding of the conditions for the functional integrity of modern buildings. More attention should be paid to the significance and meanings of the original building: the integrity of the modern heritage it is above all the imprint of the memory of original building and its functions that must be preserved." (*ibidem* p. 746).

<sup>5</sup> Before the beginning of the building's transformation (2014-2016), a deep survey has been carried out by the the Innovation Company of the TU Braunschweig (iTUBS): Zentrum Bauforschung + Kommunikation + Denkmalpflege (Dr. Olaf Gisbertz) and the Institute for Building Documentation (Sebastian Hoyer and Cristoph Müller). They have gathered archival documents and drawings, done the architectural survey

functionalism of the building which, from a laboratory for testing machines, has become a laboratory for experimenting nanotechnology, by establishing its partial demolition as well as the realization of a new hulking volume.<sup>6</sup> The result of this modification has determined the loss of some elements of the building that, through the analysis carried out as part of this thesis, turn out to be peculiar characters that should be have preserved.

The building is representative of a category of architectures that, belonging to particular types characterized by the strong connection they have with the housed function (university and industrial buildings), run in the same way the risk to be irremediably modified, since it is the function itself that defines their fundamental characters.<sup>7</sup> So that, in the moment in which intervening becomes necessary (because of the obsolescence of materials, the methodologies and techniques' evolution, or because of a change of function) the intervention often concerns the most characteristics elements, precisely because they are strictly connected to the original function. In this

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through laser scanner and a photographic campaign. All this documentation has been made available for the development of a deeper analysis of the building, accomplished in this research.

<sup>6</sup> The project is the result of a collaboration between the RKW and the Meyer Architects of Düsseldorf in the years 2014-2015 (<http://www.meyer-architekten.de/projekte/bildung/universitaeten/technische-universitaet-braunschweig/>, accessed on Januar 13, 2016.)

<sup>7</sup> For much more considerations about the industrial type, see: Henn, Walter: *Bauten der Industrie*. Verlag Georg D.W. Callwey, München 1955; Fohel, Axel: *Bauten für Industrie und Technik*. Nationalkomitee für Denkmalschutz, Bonn 1994, pp.128-161; Darley, Gillian: *Fabbriche. Origine e sviluppo dell'architettura industriale*. Pendragon, Bologna 2007; Gibello, Luca et al. (eds.): *Stop&go: il riuso delle aree industriali dismesse in Italia*. 30 casi studio. Alinea, Florence 2005. An exemplifying case of industrial building whose function has been changed is the Lingotto Fiat in Turin, designed between 1914-1925 by Giacomo Mattè-Trucco and transformed in 1989 by Renzo Piano (see Prudon 2008, pp. 452-461). An illustrative example whose function hasn't been changed is the Fagus Factory in Alfeld, designed by Walter Gropius between 1911 and 1925 and restored between 1985 and 1988 by jörn Behnsen (see Busco Ferber, Elena: *I restauri delle Officine Fagus*, in: *Costruire in Laterizio*, 1997, 60, pp. 402-405, Gillian 2007, pp.139-148 and Pevsner, Nikolaus: *I pionieri dell'architettura moderna*. Architettura, pittura, design: la storia del movimento da William Morris a Walter Gropius. Garzanti Elefanti, Milano 2015, pp. 241-256, with a comparison with the AEG Factory by Peter Behrens). For much more considerations about the university type see: Gerbaulet, Sabine; Kuntzsch, Brigitte: *Vom Wiederaufbau zur Massenuniversität*. Technische Universität Darmstadt, Darmstadt 2000. Exemplifying cases of analized and reused University buildings are: the University City of Caracas (realized in 1943 by the architect Carlos Raúl Villanueva and inscribed in the UNESCO's List of World Heritage Sites), which represents a case study of a heritage site needing inevitable extensive changes because of new requirements and for which a proposal of analysis has been presented (see Salas, Andriana: *Introducing a 3-Level Approach for the Identification and Analysis of Impacts on Modern Heritage Sites: the Case of the Campus of the Ciudad Universitaria de Caracas*, in: Tostões, Ana; Ferreira, Zara (eds.) 2016, pp. 342-347); the St Peter's Seminary in Scotland, realized in 1966, abandoned in 1987, listed as a "Category A" protected building and recently subject of an adaptive reuse project (see Allan, John: *Joining the Past with the Future. The Rescue and Adaptive Reuse of St Peter's Seminary, Scotland*, in: Tostões, Ana; Ferreira, Zara (eds.) 2016, pp. 356-363).

sense, the knowledge and the respect of the designer's intent and of the building significance, make possible respecting and preserving the building itself.<sup>8</sup>

Moreover the focus is on architectures realized in an historical period of intensive constructive activity and, in Germany, of great economic difficulties (the years 1950s and 1960s) as a reaction to the need of new constructions following the huge losses happened during the Second World War, together with the great experimentation of new materials.<sup>9</sup> These aspects influence the choices taken by the designers with repercussions for the building destiny, particularly at the moment when it is considered as to be preserved and, at the same time, to be conformed to different uses.

The Institute for Piston Engines in Braunschweig, from which the requirement to face this problem comes to mind, also represents the first case study around which the methodology of analysis is developed. **The aim is to understand what elements should be preserved** with a view to possible re-functionalism or transformations. In this respect, the analysis is functional for giving answer to the following questions:

- what elements, characters, materials are building's identity and deserve to be preserved;

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<sup>8</sup> The importance of taking into account the designer's intent in the adaptive reuse of modern or contemporary buildings is underlined in many recent researches by different academics. In particular, during the 14<sup>th</sup> Docomomo International Conference in Lisbon (6-9 September 2016), whose subject was the "adaptive reuse", many interventions concerned this topic: Overmann, Heike: Converting Industrial Complexes in European cities: Best Practices, in: Tostões, Ana. Ferreira, Zara (eds.) 2016, pp. 268-273; Macdonald, Susan; Burke, Sheridan: "Preserving the Ephemeral": Capturing what makes the Eames House Special through Conservation Planning, in: Tostões, Ana. Ferreira, Zara (eds.) 2016, pp. 305-311; Jean, Giacinta; Martinis, Roberta; Fornari, Davide: Casa Zentner: Development of a Conservation Strategy, in: Tostões, Ana. Ferreira, Zara (eds.) 2016, pp. 467-472; Ben Avraham, Oren: Beyond Buildings Themselves: Rethinking Contemporary Architecture through the Preservation of Modern Architectural Ideas, in: Tostões, Ana. Ferreira, Zara (eds.) 2016, pp. 553-559; Vadstrup, Søren: In search of Identity – A new Method to Analyse and Assess Intangible Heritage, in: Tostões, Ana; Ferreira, Zara (eds.) 2016, pp. 560-565 (in this research, a methodology for analysing houses and understanding their character and identity is described).

<sup>9</sup> see, among other: Hassler, Uta; Dumont d'Ayot, Catherine (eds.): Bauen der Boomjahre – Paradoxien der Erhaltung/Architectures de la croissance – Les paradoxes de la sauvegarde. Zurich/Gollion 2009; Gisbertz, Olaf (eds.): Nachkriegsmoderne kontrovers - Position der Gegenwart. Jovis, Berlin 2012; Schmiechen-Ackermann, Detlef; Otte, Hans; Brandes, Wolfgang (eds.): Hochschulen und Politik in Niedersachsen nach 1945. Wallstein Verlag, Göttingen 2014; Gisbertz, Olaf: Reflexion und Transformation: Erhalten und Weiterbauen der (Nachkriegs-)Moderne. Braunschweig Technical University, Braunschweig 2017.

- what intent had the designer with regard to the building's duration and possible future transformations.

The analysis examines the building through four categories (bibliographical, archival, graphical and technical) deducing from each of them that information that allow to give answer to the questions which are at the basis of this research.

In the analysis the investigation on technical data is highlighted: this is the investigation on materials, on constructive modalities, on decay of the different materials and on their resistance over time. In fact, not only this analysis is necessary to understand the characteristic elements; it also allows to figure out, starting from the evaluation of the chosen and used material's quality, whether the designer's intention was realizing a very flexible building to be easily convertible, or conveying it a sense of immutability.

## 1.2 Objectives

The main objective of this thesis is **to furnish a contribute to the designers** who are facing a project of transformation for a building which, as for the case study, is strictly linked to the housed function, from which the compositional, architectural and technical characters depend on. For this reason an instrument of analysis is proposed, through which **understanding what characters and what elements of the building should be preserved** looking to a transformation, re-functionalism or restoration.

The circumstance from which this research follows on concerns a building, which has been recognised to be exemplifying of a typology and innovative because of the devices the designer has adopted, with respect to the years in which it has been realized, so that it has been listed for one year and half (from the 14<sup>th</sup> February 2013 to the 11<sup>th</sup> July 2014)<sup>10</sup>. In 2012<sup>11</sup> it has been established the necessity of an intervention of restoration (for a variety of reasons not debated in this context) and in 2014 it has been chosen to move the housed Institute in a different new building. At the same time, the existing old building has been destined to house a new Institute for Nanometrology. This change of function in the old building means a radical alteration of the object, since it implies converting a building, designed for testing machines, in a building suited

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<sup>10</sup> according to § 7 (2) Nr. 2 NDSchG ND. See also Gisbertz, Olaf; Hoyer, Sebastian: „Über das alte und das neue Bauen“ – Zu Bauten für Industrie und Wissenschaft von Walter Henn, in: Mainzer, Udo; Werner, Ferdinand (eds.): INSITU. Zeitschrift für Architekturgeschichte, VIII, 2016, 2, p. 276

<sup>11</sup> <https://www.tu-braunschweig.de/ivb/wir/geschichte>, accessed on December 5, 2015.



for measurements at the nanoscale. This means also the passage from a protecting situation, that is also of “not-transformability”, to a situation of inevitable transformation, or re-adaptation, in order to adjust the building to the change and to the new needs.

Among the objectives there is **the evaluation of the** aforementioned **project of conversion**. At the beginning of the present thesis compilation, it was already known that the reconversion project of the building didn't consider just the spaces re-adaptation to a new function. In fact, since the new function is completely different from the previous one, it has been also necessary a partial demolition of the building side that housed the testing rooms, of the chimneys, of the of the garages - housed in a small one floor building- and the realization of a new big volume connected with the existing. The outcome of this transformation is inevitably under judgment by the analysis of the building through which the methodology is developed. The evaluation occurs through the comparison among the results emerged from the carried out analysis (the elements that should have been preserved) and the elements which have been lost after the building transformation.

A further intent concerns **the evaluation of the materials behaviour in response to the passage of time and to the decay causes**. The technical-material aspect assumes a great importance in the analysis context, since through that it is **possible to search for how much the designer's choices have influenced the life and the destiny of the building**. As explained by Susan McDonald, the rebuild after the Second World War needed to be fast, economic and efficient for satisfying a wide-scale of construction. This has led to the industrialization of construction and to the experimentation of new materials, with a focus, for some architects, on the resulting social changes, much more than on the longevity of buildings. At the same time, the lack of materials and economic problems resulted in the choice of poor materials and so of a poor quality of construction that, together with a lack of maintenance over the years has meant a greater deterioration of the buildings. Other architects, however, preferred well-constructed buildings and gave much more attention to their long-term performance.<sup>12</sup> For this reason, for the building analysis, it has been taken into account that:

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<sup>12</sup> MacDonalds, Susan: Materiality, monumentality and modernism: continuing challenges in conserving twentieth-century places. Getty Conservation Institute, Los Angeles 2009, pp. 3-4.

1. The choice of materials is linked to the idea of duration that the designer had in mind for the building: extremely flexible, and so destined to a nominal life of a few dozens of years, or very durable, and so destined to a lifetime that was longer than 50 years (expected durability for the concrete nominal life)<sup>13</sup>;

2. The state of materials, exactly after 50 years (1965-2015), determined by the analysis of decay, are linked to the designer's idea in respect of the duration of the building. In fact it expresses implicitly the quality of materials (in particular for the concrete) and, the good or poor quality, and may depend on:

- a lack of experience at the moment of the project of the behaviour of materials over time (in particular for the concrete);
- a compromise between quality and low cost;
- an aware choice that was connected, indeed, with the idea of duration.

3. The link between the causes and the type of decay of materials allows to understand what influenced the decay progresses (external factors, the function, and the lack of maintenance or the designer's choices);

4. The comparison with other buildings belonging to the same designer from the material point of view, allows to systematize the case study together with other cases, that can be less or more similar, but having in common the author (who made choices). In this way, the comparison allows to understand how much the designer's choices are linked to the specific case and function and how much to his thought.

### **1.3 Structure**

The work carried out in this thesis goes from the particular (for the elaboration of the methodology) to the general (for its generalization) and then again to the particular (for the application of the elaborated generalized methodology to a case study in order to verify its applicability). In this sense, it concerns the analysis of two different case studies, belonging to the same typology, realized in the same historical period and with the same materials. But they are located in different places (the first one in Germany,

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<sup>13</sup> Both Italy and Germany consider, for ordinary buildings, a nominal life > 50 years. Usually the effective life of a work is bigger than the nominal one since often maintenance interventions are effectuated on the buildings so that they add years to their life.

the second one in Italy) and they have been designed by different architects (Walter Henn and Giuseppe Nicolosi). Moreover, the German case study has been recently subjected to a transformation (occurring during the thesis processing), whereas the Italian case study has been not recently restored, but it fall into disuse in 2013 because of the relocation of the Faculty of Medicine in a different location<sup>14</sup>. On the one hand the emerging data for the German case study can be used for an evaluation of the already happened transformation; on the other hand the conclusions of the Italian case study can be useful for a possible intervention of restoration.

In this regard, after a chapter that describes the methodology adopted and what view does in relation to other previous studied and adopted methodologies, the central part of the thesis is evenly divided in two parts (the third and fourth chapters), each of them concerning one case study and presenting all the information that arise from the analysis. In particular a first look to **the city planning indications, purposes and restrictions** is given, in order to include the building in its urban and historical city context, to understand how much the city and (in this cases) University objectives have influenced the designer's decisions and thought, if the given restrictions have been a limitation or an opportunity for him and how the new project fits in its context. Then the thesis deals with **the designer**, his professional life, ideas, main fields, main activities, main planned typologies and everything that has influenced his thought. An important source of information are his publications, from which it is possible to have clear and direct indications about his idea of architecture, his design principles, his way of facing the building typology and, through his sentences, looking for his conception about the duration of a "functional architecture"<sup>15</sup>. When they are present (like it has been for the two case studies belonging to this thesis) the magazine articles about the designer's projects are also a very important source, in particular for observing the different or analogous approaches taken in each project, for tracing the comments and information right after the realization of the building and for making a comparison with the actual state. All the information determined in this chapter section are necessary to understand how much the building depends on the designer's ideas and how much the other external factors influence the project results. The last part of the chapter analyses

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<sup>14</sup> The information about the italian case study have been provided by the technical office of the Perugia University.

<sup>15</sup> With functional architecture it is here meant those buildings that have such a strong dependence from their function that their shape, architecture, structure and spaces derive from it. See the following chapter 1.4.1 about the typology.

the buildings themselves by considering some different aspects: the function, the architecture, the construction (structure, methods, materials) and the state of conservation. These aspects are functional for having a complete understanding of the building and of its actual state. In particular, in order to determine the main characters of the building, it is important to understand how much and in which way the history and the state of the building are linked to each factor.

The cornerstone of the work is the proper analysis of the buildings through the sheets that is explained in the fifth chapter. It represents the proposal of a methodology of analysis and all the investigations are presented aside from the main text (so that they can be fully read). Moreover each sheet part is recalled in the corresponding chapter side according to the investigated category. In fact the sheets are divided in four categories of investigation (bibliographical, archival, graphical and technical) and through them the information are summarized, schematized and organized in such a way that the relevant data, for answering the questions at the basis of the thesis, emerge. The chapter explains the structure of the work, the determination of the sheets structure on the first case study, the generalization and the application to the Italian case study.

The penultimate chapter is a critical summary of all the work, on the findings of the analyses, on the methodology usability and on the possible changes to be adopted. In particular the work of transformation of the Institute for Piston Engines is evaluated according what emerged through the different investigations: the aim of the sheets is to understand “the elements that should be preserved”. Starting from these it is possible make a comparison with the elements actually maintained by the intervention. The methodology is evaluated at the same time, in particular thanks to its application on the Italian case study, from which it emerges how much it is usable, useful and if it is applicable in other situations (for the same typologies) or if it should be changed somewhere.

The last part of the thesis concerns the advices emerged from the application of the methodology for any possible intervention of transformation or refurbishment. In particular as regards what elements and characters of a project should be absolutely taken into account since they are necessary for understanding the essence of the

building, its concept and, in this way, its main characteristics that often are not considered.

## **1.4 Some preliminary definitions**

A necessary prerequisite before going into the question is the definition of the types and of the historical time in order to establish the borders and the context by which the thesis develops. In fact the two case studies from which the methodology is determined and experienced have to represent a limited case system so that the identification of the several aspects of investigation, belonging to the different categories, can be easily achieved. The further step, following the application to the second case study, is a generalization of the first obtained procedure with the aim of improving it and made it applicable to a wider range of cases.

### **1.4.1 The type**

The thesis considers a category of buildings rather than a single type. It starts from some considerations about a specific building (the first case study) which belongs, at the same time, to two types: the university and the industrial architectures. One of the reasons why it has been strongly transformed, is its equally strong bond with its function: entire rooms were designed just for housing machines or for letting the air to pass through them; an entire floor was completely arranged depending on the activity of testing the engines; the technical devices, specifically designed by Henn himself, have determined the architecture composition (for example through the chimneys).<sup>16</sup>

It has been chosen to limit the search field to the university architectures<sup>17</sup> both for defining the methodology and for its application: either case studies are university buildings, but the first one can be considered on a par with the industrial architecture

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<sup>16</sup> Please refer to chapter 3 for the complete reading of the issue.

<sup>17</sup> For the University type see, among others: De Carlo, Giancarlo: *Problemi, progetti realizzazioni dell'edilizia universitaria*. CLUVA, Venezia 1965; Carbonara, Pasquale: *Architettura pratica. Gli edifici per l'Istruzione e la cultura*, vol. 3, tome II. Turin 1976; Rebecchini, Marcello: *Progettare l'Università. Le analisi preliminari e le scelte progettuali di fondo*. Kappa, Rome 1981; Rome University, Faculty of Engineering (eds.): *Edilizia Universitaria. Spazi funzionali e standards dimensionali*. DEI, Rome 1981; Neuman, David J.: *Building type basics for college and university facilities*. Hoboken, Wiley 2013; Armetta, Antonella (eds.): *Architetture universitarie del 20. secolo e loro modelli di riferimento*. Palermo University, Palermo 2014.

because of its technical devices. What the two buildings have in common is their dependence to the function so that, in the event of a change of function, some parts of the building have to be altered or removed. In this respect, **the category of buildings for which this procedure of analysis can be applied is the functional architecture here defined as *the architecture which has such a strong dependence from the housed function that its shape, plan composition, spatial distribution and structure, derive from the function itself.*** This definition includes both the university and the industrial buildings, thus the methodology can be used for either the typologies.

#### 1.4.2 The historical period

The chosen historical period are the years between 1950s and 1970s. Both in Italy and in Germany the wounds of the big War are evident and in these years the rebuilding operations proceeded at a rapid pace following the first housing emergency interventions immediately after the end of the war. If in Italy the rebuilding meant mending the urban pattern, in Germany it signified in many cases building from scratch entire cities or parts of cities. This different necessity of interventions entails a different manner for the designers who were engaged in the rebuilding, on the ground of the different level of damage.

The two case studies concern both of the circumstances, since Braunschweig represents a German destroyed city, with a completely ripped urban fabric where only isolated portions of the historical structure survived<sup>18</sup>; instead Perugia had just isolated episodes of damaged buildings meanwhile the historical centre survived almost entirely.<sup>19</sup> From these different backgrounds, derive various ways of acting.

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<sup>18</sup> Kraemer, Friedrich Wilhelm: Zum Wiederaufbau historischer Bauwerke in Braunschweig, in: Denkmalpflege 1975: Dokumentation der Jahrestagung der Vereinigung der Landesdenkmalpfleger in der Bundesrepublik Deutschland; Goslar, 15-20 June 1975. Hannover: Niedersach. Landesverwaltungsamt-Denkmalpflege (1976), pp. 103-106; Büttenbender, Ilona: Braunschweig. Richard Borek Stiftung, Braunschweig 1989; Heitefuß, Dieter: Aus Trümmern auferstanden: Braunschweig und sein Wiederaufbau nach 1945; eine Biddokumentation. Heitefuß, Braunschweig 2006;

<sup>19</sup> For the history of Perugia, see: Grohmann, Alberto: Le città nella storia d'Italia. Perugia. Laterza, Rome-Bari 1981, pp.142-169. For the Perugia contemporary architecture please refer to: Soletti, Adriana; Belardi, Paolo (eds.): Architettura contemporanea in Umbria. Nuove tendenze. University of Perugia, Perugia 1996; Belardi, Paolo: L'architettura 1946-1959, in: Ponti, Antonio Carlo; Boco, Fedora (eds.): Terra di Maestri, Artisti umbri del Novecento 1946-1959. Edilmond, Città di Castello 2004, pp. 49-54; Belardi, Paolo: L'architettura 1960-1970, in: Ponti, Antonio Carlo; Boco, Fedora (eds.): Terra di Maestri, Artisti umbri del Novecento 1960-1968. EFFE Fabrizio Editore, Perugia 2005, pp. 43-49; Belardi, Paolo: L'architettura 1969-1980, in: Ponti, Antonio Carlo; Boco, Fedora (eds.): Terra di Maestri, Artisti umbri del Novecento 1963-1980. EFFE Fabrizio Editore, Perugia 2006, pp. 69-75; Pisani, Mario: Lineamenti di storia dell'architettura contemporanea. Umbria 1981-2000, in: Ponti, Antonio Carlo; Boco, Fedora (eds.): Terra di

On the one hand in Braunschweig<sup>20</sup> there was the need, and the desire, of rebuilding a new city, which could be much more functional, orderly and liveable than the older one and that could release people from the war damages. The new universities buildings were at the same time necessary, because of the number of students increasing, and they were an opportunity for the definition of the new city expansion: through them, which were a series of new big buildings scattered in the green and contaminating the city from the centre to the periphery, it was possible drawing the city of the future that, at the basis, consisted in a “city of culture”.

On the other hand in Perugia<sup>21</sup> there wasn't the need of rebuilding a city, but rather the aim of preserving what had been spared during the war by ensuring a respectful expansion of the old and of the new city. In this context the Nicolosi work doesn't focus on the periphery but in the old town and it regards a reconnection of some parts of the city separated by voids, through the realization of new university buildings which were able not to visually divide the historical fabric but to be integrated into it, both spatially and materially.

Both in the two cases, the interventions through new university architectures have to be read according to the urban context, through which they acquire significance since they represent the rebirth after the war over the culture and they are bearer of a new architecture speech which only in a free context can be experienced.

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Maestri, *Artisti umbri del Novecento 1981-2000*. EFFE Fabrizio Editore, Perugia 2005, pp. 70-89; Canali, Ferruccio: *L'architettura del Novecento*, in: Avellino, Raffaele (eds.): *Percorsi d'architettura in Umbria*. Editrice Centro Italia, Foligno 2010, pp. 531-607.

<sup>20</sup> For the urban context and limitations, please refer to the chapter 3.1

<sup>21</sup> For the urban context and limitations, please refer to the chapter 4.1





## 2. Methodology adopted for the analysis

### 2.1 State of art

The purpose of a methodology of analysis for contemporary buildings strictly linked to their function, that is the subject of this thesis, is based on, and develops from, the Prudon researches about the specific investigation of modern buildings, aimed to their preservation.<sup>1</sup> In particular, **Prudon explains how to identify and decide what is significant to be preserved in a modern building.**

The interest for the preservation of modern architecture has begun just in the 1950s and 1960s, but a real acknowledgement of it, has taken places just in the 1990s thanks to associations like DOCOMOMO which, with its first principles, has asserted the importance of not-iconic buildings, whose significance is determined through the survey.<sup>2</sup>

One of the biggest challenges in the preservation of modern architecture is represented by its temporariness and a big discussion concerns the choice between the maintenance of the authenticity of materials or the preservation of the design intent (two possibilities which not always can coexist together).<sup>3</sup> According to Prudon, the two alternatives have both the same degree of importance and it's necessary to consider the relationship between them during the study of a building.<sup>4</sup>

One of the main difficulties which emerges in analysing recent buildings is how to understand their significance (their uniqueness with regard to a context). In fact, since the modern buildings occur in much greater number than the ancient ones, and since they are so recent so that often they aren't considered heritage to preserve, it is difficult acting a comparison among a so great number in order to understand which is the most significative. One of the most frequently utilized criteria is the **comparative**

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<sup>1</sup> Prudon, Theodore H. M.: Preservation of Modern Architecture. John Wiley & Sons, New Jersey 2008, pp. 156-179.

<sup>2</sup> see <https://www.docomomo.com/index#>, accessed on Februar 12, 2015. See also the history description in Prudon 2008, pp. 10-14. For further publications about traditional methodologies see: Harris, Samuel Y.: Building Pathology: deterioration, diagnostics and intervention. John Wiley & Sons, New York 2001 and Friedman, Donald: The investigation of buildings: a guide for architects, engineers and owners. W.W. Norton, New York 2000.

<sup>3</sup> Please refer to note 4 of the introduction.

<sup>4</sup> see Prudon 2008, pp. 35-37.

**analysis of data** to arrive to a hierarchy of significance.<sup>5</sup> This criterion is approved as a scientific methodology and it is based on the examination of a group of buildings based on a specific commonality. It is suitable for modern buildings since it considers groups of buildings and so, it allows the comparison among a great number of cases<sup>6</sup>.

In modern and contemporary buildings, it is possible to have a great quantity of drawings, documents and records available, unlike for oldest buildings so that to collect as much relevant information about a building's historic condition and its current state. Thanks to all these information, it's easier having an inclusive comprehension of a building significance, history and performance that is useful also for protecting it against the mistaken beliefs about the little importance of modern buildings.<sup>7</sup> According to Prudon, there are four categories for dividing the documents and records concerning a building:

- the graphic documentation (that is the collection of all the drawings, photographs, sketches made by the architect during the design process);
- the written records related to its design (correspondence, meeting reports...);
- oral histories and interviews;
- literature and newspaper.<sup>8</sup>

Indeed, **all the information and documents are necessary for having a comprehensive overview of all the factors and the elements that make a building significant**, since understanding the significance of a modern building and the designer original intent is necessary in the interest of its protection and before any change or alteration. And right compiling the information allows a deep understanding, as Prudon explains in this sentence:

“Compiling the information on the construction process, the existing conditions and the historical research will yield a greater understanding of the building”.<sup>9</sup>

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<sup>5</sup> Prudon 2008, pp. 156-159.

<sup>6</sup> One of the peculiarity of modern architecture is the great number of buildings that makes it difficult to choose “how many and in how much detail to study, analyze and determine what to save, why and how” (Prudon 2008, p. 159). In this regard, the thematic study is frequently used because it consists of “a comparative analysis of data used to arrive at a hierarchy of significance and a basis for decision making” (ivi).

<sup>7</sup> Prudon 2008, p. 158.

<sup>8</sup> *ibidem*, p. 168.

The Prudon investigation can be applied to any building typology. Through the graphic documentation it is possible to understand the design intent, the process of construction, the taken decisions and the happened changes during the building life. In the graphic documentation Prudon includes the design drawings, the following changes, the drawings concerning the inner design, the landscape and the artworks, the engineering drawings, the published drawings in the publications of the time and the so called “shop drawings”, which show sizes and placement of the pre-fabricated components. Moreover he considers the photography, which can be both about the construction phases and the architectural pictures showing the final result (the closest to the original intent)<sup>10</sup>.

Within the written documentation Prudon also considers the maintenance records that are very useful for identifying the recurring problems over time. Moreover, through the trade catalogues, magazines and publications and the handbooks for the professional practice it is possible having a general comprehension of the standard practice of the time.

The oral resources are a lucky chance that only so modern buildings can offer and they are very precious, even if, being subjective memories, they have to be always compared with much more objective information. Therefore, when it is possible, it could be very useful collecting the records of people taking part to the building project or construction or of people that have used and lived it.

The building itself can be considered an important document that has to be analysed through a physical analysis of the existing conditions and through technical investigation (both on-site testing, which can be destructive or not destructive and laboratory testing). The on-site testing serves to define the configuration of the building and its component materials; the laboratory testing allows to evaluate the durability and performance of materials, both inside and out.

The need of a complete analysis, which takes into account all the categories specified by Prudon, is all the more necessary for buildings with a specific function, since they are most likely to become obsolete, and so, unsuitable for the original or new function

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<sup>9</sup> *ivi*. This suggestion is applied in the proposed methodology of analysis: compiling and selecting information makes possible to catch that elements and characters that give significance to the buildings.

<sup>10</sup> *ibidem*, pp. 168-172, for all the documents Prudon considers in his methodology.

and for the new requirements. A building can become obsolete because there is the need to improve the function, to completely change it, or for a better accessibility, security or energy efficiency and sustainability. In this case a change, which sometimes can be very important, is required in order to conform the building to the new necessities.<sup>11</sup> For this reason it is important that the significative elements, representing the meaning of the building, to be understood.

## 2.2 Through the case studies

**The here proposed methodology is aimed at the investigation of the buildings in order to understand their significance and the elements that make them significant.** The method develops starting from a single case study, which acts as a sort of test sample and the investigation is led through schematized sheets. **The sheets are organized according to four categories of investigation, on the basis of the Prudon indications about the modern buildings analysis** (explained above). The sheets resulting from the first case study analysis are then generalized in order to be applied to the second (Italian) case study. This application operates also as a validation of the sheet organisation which, if necessary, is changed where it doesn't work as a general methodology: in fact the aim is to obtain a much more general methodology which can be applied in other similar cases of functional buildings, belonging to the same historical period and located in any other place.

**The two case studies are both university buildings strictly tied to their function** that is very specific. The German case is a technical laboratory for testing engines, with peculiar spaces and devices that can belong to an industrial building too<sup>12</sup>; the Italian case houses almost exclusively a Great Hall whose shape and structure define the whole building<sup>13</sup>. The German case study is earlier than the Italian of about 10 years, but they both belong to the considered range of years and they belong to the city interventions made after the Second World War (in Italy much more slowly). Both the two buildings have also in common the employed materials that are concrete for the structure and bricks for the cladding, besides glass and iron for the windows.

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<sup>11</sup> Prudon 2008, pp. 173-175.

<sup>12</sup> For the sheet analysis of the German case study look at page 160.

<sup>13</sup> For the sheet analysis of the Italian case study look at page 263.

The two buildings have been both abandoned (the German one in 2013 and the Italian one in 2012) because of the relocation of their function in new buildings. But while the German building has been completely transformed and destined to another function, the Italian one has remained abandoned without any new intended use.

**The great difference in the two case studies is the historical, social and economic context.** After the Second World War the German city of Braunschweig was quite completely destroyed and it had great difficulties, first of all economic, also because of the very big request for housing and working places, hard to satisfy. At the same time the number of students greatly increased so that the need of new university buildings was as much fundamental to satisfy as the need of new houses. In Perugia, instead, there weren't damages due to the War, except for isolated cases, and the historical centre had remained untouched. For this reason there wasn't such a dramatic situation as in Braunschweig and there wasn't the emergency of rebuilding entire parts of city and of housing lots of people together with very serious economic problems. The need of new university buildings occurred later after the end of the war, it didn't represent an emergency, like in the German destroyed cities, so that it could be carried on unhurriedly, completed in more time and with a greater reflection. In this sense, **the two case studies are representative of two completely different situations** (because of the geographical, social and economic context) **while they share the type and the materials.** For this reason **they are prime examples for developing the methodology of analysis suitable for the university buildings and adaptable, at the same time, to other functional types in different contexts.**

### 2.3 Through the sheets work

The sheet investigation tries to follow the research made by Prudon relative to the modern architecture, putting into practice, organizing and developing his advices. It is divided in **four categories** (bibliographical, archival, graphical and technical) **according to the elements that have to be analysed, so that all the factors related to the building significance are considered** without overlooking anything. In particular, the bibliographical investigation<sup>14</sup> includes the publications relative to: the

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<sup>14</sup> See the index at page 360.

designer, the building itself, the same typology, the coeval architecture, the urban context; if present, it includes also the oral testimonies<sup>15</sup>; in the archival investigation<sup>16</sup> the graphics of the original project and the graphics of the urban planning of the time are analysed; in the graphical investigation<sup>17</sup> the analysis concerns the drawings obtained through a present architectural survey and through the photographs; for the technical investigation<sup>18</sup> the subjects of analysis are the materials and construction techniques and the materials state of decay; besides, a comparison with other buildings made by the same designer is carried on.

In the different categories, the analysed documents are collected (drawings and photographs in particular) and each aspect is examined in order to understand the significative elements of the investigated building. **Through these thematic analysis, the most useful information emerge thanks to the necessity, each time, of taking care on specific details and on selecting the right data** (as suggested by Prudon and written in the sentence above at page 20).

At the end of each category there is a “sheet summary”<sup>19</sup>, a recapitulatory table which underlines all the emerged information from the analysis, and through which the elements that should be preserved are extrapolated. Once again **the necessity of summarising the information helps to identify and mark what are the most important** and to answer to the established questions.

In the sheet generalization<sup>20</sup> spaces for documents, drawings and writings are left, exactly following the same order used for the case studies. For each sheet which has to be filled out, a sentence indicates what information are required until the final summary table.

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<sup>15</sup> Prudon considers the oral testimonies a privileged resource given by the most recent buildings. They have to be verified, but they are a precious opportunity. Among them, the oral testimonies of the designer, the builders, their families and aficionados; but also the records of the users can be very important (Prudon 2008, pp. 163-164).

<sup>16</sup> See the generalized index at page 374.

<sup>17</sup> See the generalized index at page 380.

<sup>18</sup> See the generalized index at page 393.

<sup>19</sup> You can find the four generalized “sheets summary” at the pages 373, 379, 392, 403.

<sup>20</sup> See at page 359.



### **3. The German case study: the Institute for Piston Engine in Braunschweig**

#### **3.1 The city planning characteristics**

In the sheets the urbanistic planning is discussed:

in the bibliographical investigation, through the publications concerning the urban context and the insertion in the historical-urban-architectural-typological context (pp. 193-194).

in the archival investigation, in the dedicated section “urban plans” that is divided into graphics and analysis (planning state of art before the project, plan principles, restrictions and limitations (pp.214-221).

The difficulty in the new City Plan after the Second World War is trying to regulate the construction both in the urban context and in free contexts, outside from the city centre, where the buildings are on greenfield sites. Particularly in this context a central role is played by the new University buildings whose organisation in the big green spaces, because of the great extension, is decisive not only for its future development, but also for the future image of the city. It is also necessary to give answer to professors, researchers, society and to their different needs at the same time. For the University of Braunschweig and for the Institute of Piston Engine, should be considered as much the City Plan as the University Plan that are arranged consistently with each other. In particular, the Plan drawn up in 1961 by the University and following the Recommendations of the Scientific Council, that is at the basis for the Institute of Piston Engine project, entails unavoidable changes to the City Plan.<sup>1</sup>

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<sup>1</sup> About the city planning in Braunschweig and, in particular, in the Braunschweig University after the Second World War, please refer to: Gliederungsplan der Stadt Braunschweig 1945, in: Deutsche Akademie für Städtebau und Landesplanung (eds.): Deutscher Städtebau nach 1945. Essen 1961; Gesamtplanung der Technische Niedersächsische Hochschulbaugesellschaft (eds.): Gesamtplanung der Technische Hochschule Braunschweig. Neubauamt für die Technische Hochschule Braunschweig – Zwischenbericht 1965/1966. Braunschweig Technical University, Braunschweig 1966; Pump-Uhlmann, Holger: Wiederaufbau und Ausbau der Hochschule nach 1945, in: ; Kertz, Walter; Albrecht, Peter: Technische Universität Braunschweig: von Collegium Carolinum zur Technischen Universität; 1795-1995. Braunschweig Technical University, Hildesheim 1995 pp. 733-779; Pump-Uhlmann, Holger: Wiederaufbau und Ausbau der Hochschule nach 1945, in: Vom Bildungspalast zum Forschungslaboratorium. Hochschulbauten und – planungen als Spiegel wissenschaftlichen und gesellschaftlichen Wandels – dargelegt am Beispiel der Technischen Universität Braunschweig 1745-1995. Dissertation. Delft Technical University, Delft 1996, pp. 191-259. See also: Wilhelm, Karin: „Mut zur Selbsterziehung“-Das Hochschulforum von Friedrich Wilhelm Kraemer als programmatische Stadtraumfigur, in: Gisbertz, Olaf (eds.): Nachkriegsmoderne kontrovers - Position der Gegenwart. Jovis, Berlin 2012, pp. 68-83 and



Immediately after the war (1946-1947)<sup>2</sup> the first City Plan (picture 1) is drawn up by Johannes Göderitz<sup>3</sup> together with the city council and the professor Friedrich Wilhelm Kraemer (who had already dealt with the city Rebuilding Plan in 1945); the city appears completely destroyed and the central University building (designed by Constantine Uhde in 1877) is gravely damaged. In the immediate emergency, it is planned the rebuilding of the central building and an arrangement of the University City (including the technical Institutes) in adjacent buildings just surrounding the main building and still placed within the city borders<sup>4</sup>. New buildings are considered in front of the central building main entrance, for housing the Administration, the Library and the Rectorate.<sup>5</sup> The principles of the rebuilding according to Göderitz are not so conservative, as happens in other areas of Germany (in particular in the south); the priority is given to the functionality, accessibility and hygiene of the city.<sup>6</sup> Already in 1948 (picture 2) the needs change because of a sudden and considerable increase of the students number and consequently, the need of much more space, both for living and for studying.<sup>7</sup> But at this time, some areas exactly around the central building are no freer because of the construction of new residential buildings.<sup>8</sup> At the same time some Institutes express the need to move from the central area for having appropriate spaces (in particular the Physics and Mechanical Institutes) also because their testing activity causes noise and pollution.<sup>9</sup> For these reasons, it becomes inevitable thinking to extend the University also in areas external to the city, never built until so far. Besides, the previous plan has

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Siekmann, Frederik: Detail und Bild-Das Hochhaus der TH Braunschweig von Dieter Oesterlen, in Gisbertz, Olaf (eds.) 2012, pp. 84-95.

<sup>2</sup> Gesamtplanung der Technische Niedersächsische Hochschulbaugesellschaft 1966, p. 3.

<sup>3</sup> (1888-1978). He has been an architect, town planner and professor. After the Second World War he took care of drive up the Braunschweig city plan. See Böttcher, Roland: Die Architekturlehrer der Technischen Hochschule Braunschweig, 1814-1960. Braunschweig 1987, pp.35-38. Göderitz, Johannes: Zerstörung und Aufbau. Statisch Amt., Braunschweig 1949.

<sup>4</sup> see Pump-Uhlmann 1996, pp. 199-201 and Gesamtplanung der Technische Niedersächsische Hochschulbaugesellschaft 1966, p. 3. The rebuilding in the first years was very difficult, but Braunschweig was one of the first University in which the activity restarted (already at the end of 1945). For the rebuilding also students, professors and university collaborators contributed, since there was a great lack of manpower and, at the same time, a strong need of the buildings.

<sup>5</sup> Pump-Uhlmann, Holger 1995, pp. 736-737.

<sup>6</sup> The Göderitz principles for the West Germany, are shown in Göderitz, Johannes; Rainer, Roland; Hoffmann, Hubert: Die gegliederte und aufgelockerte Stadt. Archiv für Städtebau und Landesplanung 4. Wasmuth, Tübingen 1957

<sup>7</sup> Gesamtplanung der Technische Niedersächsische Hochschulbaugesellschaft 1966, pp. 3-4.

<sup>8</sup> Pump-Uhlmann, Holger 1995, p. 737.

<sup>9</sup> About this request, see the letter sent on 22.12.1951 by the Rector to Ratsherrn Höft in: Uni BS All: 109-110.

received many critics and a Commission is established to judge it.<sup>10</sup> The new Plan should maintain the principle of the “Traditional Islands” belonging to the City Rebuilding Plan, since the Uhde building represents itself one of the islands.<sup>11</sup> These areas have been defined by Friedrich Wilhelm Kraemer and Hermann Flesche immediately after the end of the Second War in the Rebuilding Plan for the city centre of Braunschweig: in these islands the historical characters, even if not all original because of their destruction during the war, are preserved through a faithful rebuilding (in particular of the facades) according to the anastylosis technique. As expansion areas for the realization of the “University city” the so called “Langer Kamp” and “Bülten” areas, placed next to the historical zone, are considered.<sup>12</sup> Between 1945 and 1951 the old building is rebuilt and between 1950 and 1959 the first new buildings are realized in the “Langer Kamp” areas.<sup>13</sup>

In the **1952** City Land-Use Plan (picture 3) appears for the first time, in the University area, the distinction between the area belonging to the city centre, where the central building is placed, and the expansion areas.<sup>14</sup> The areas are not detailed (this is a task of the University Plan), but this distinction means that the University principles are already integrated in the City Plan and that the idea of a completely central campus is abandoned.

Because of the great economic difficulties, since the war is just over, the University Plan suggests the realization of **complexes of buildings**<sup>15</sup>, in order to save space and money. They should besides be, if possible, surrounded by wide green spaces. In this sense it is possible to read a parallel between these sorts of “islands in the lawn” and the “traditional islands”.

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<sup>10</sup> Pump-Uhlmann, Holger 1995, p. 737.

<sup>11</sup> For the “Traditionsinseln” please refer to Gisbertz, Olaf: Städtebau, in Wilhelm, Karin; Gisbertz, Olaf; Jessen-Klingenberg, Detlef; Schmedding, Anne (eds.): Gesetz und Freiheit. Der Architekt Friedrich Wilhelm Kraemer (1907-1990). Jovis, Berlin 2007, pp. 55-58.

<sup>12</sup> Pump-Uhlmann, Holger 1995, p. 738.

<sup>13</sup> *ibidem*, p. 739.

<sup>14</sup> Gesamtplanung der Technische Niedersächsische Hochschulbaugesellschaft t 1966, pp. 4-9. In the archival Investigation at page 218.

<sup>15</sup> Among the main points of the plan principles there are the promotion of complexes of buildings (in particular of double Institutes) when it could be possible, even if with the maintenance of a necessary separation of the functions and the realization of the complexes in green areas; the structure should make possible at the same time a connection and a useful separation between the teaching and the research functions (Gesamtplanung der Technische Niedersächsische Hochschulbaugesellschaft t 1966, p. 10)

The first realized Institute in these years is the Institute for the Vehicle and Heat Technology which represents the exemplificative model for the further realizations<sup>16</sup>: it is a double Institute, as suggested by the Plan, saving money in the urbanisation and in the construction; as for the then industrial architecture, it has more floors to the street, and two back and the different buildings that constitute it (offices and laboratories) are connected; their structure is frame-type in concrete and steel and their buildings architecture is minimalist. The other Institutes built in that years in “Langer Kamp” are the Institutes for Instrument Machinery and Engineering Production, for Machinery elements and Conveyor Technology, for Agricultural Machinery and Technology, for Airplane and Lightweight Construction. All of them, as the first one, are double Institutes so that they constitute complexes of buildings, isolated in a green space. They are built with a concrete or steel frame structure, and with a simple minimalist shape.<sup>17</sup>

The main observation, made since from this first plans, is inherent to the typology of the University buildings, and it lays the foundations for all the choices: **the Technische Universität buildings can be subjected to future transformations and developments** because of many reasons (the need of largest surfaces, modification of the working conditions, need of bigger machineries, different needs of study or research). This aspect requires the greater **flexibility and multifunctionality**<sup>18</sup> to the buildings, as it can be seen in the plan (picture 4)<sup>19</sup>, where the possible enlargements for all the new university buildings are represented. On the basis of the buildings division according to the typology, the Plan highlights that for the Institutes oriented to physics and chemistry, in which the laboratories require particular spaces, it is easy to imagine a future need of expansion. Besides, considering the possibility of expansion of the building, the Plan requires to design a space of 10% of extra surface for facilitating small changes.<sup>20</sup> The buildings follow besides the “free plan” principle according to the concepts of the new architecture principles by Mies van der Rohe and Wright. A further aspect which is relevant in the phase of main realization of the new University buildings is the **velocity**: in this sense the use of prefabricated materials is

<sup>16</sup> Pump-Uhlmann, Holger 1995, pp. 744-745.

<sup>17</sup> Pump-Uhlmann (1996), pp. 219-221.

<sup>18</sup> Kramer, Friedrich Wilhelm: Hochschulplanung gestern und heute, in: Bauen und Wohnen, 1962, 8, pp. 315-317.

<sup>19</sup> In the archival investigation at page 219.

<sup>20</sup> Gesamtplanung der Technische Niedersächsische Hochschulbaugesellschaft t 1966, pp. 192-193.

favoured in order to accelerate as much as possible the implementation time and, at the same time, to facilitate possible future changes.<sup>21</sup> For these reasons, in few times, a great number of new university buildings placed in peripheral large green areas, to be easily expandable, are realized in many German cities completely changing their image.<sup>22</sup>

From the 1957 also the area “Bülten” is taken into account because of the need of much more Institutes given the continued increase of students.<sup>23</sup> The two areas are indicated in the 1959 *Erweiterungsplan für die TH Braunschweig – Bereich “Langer Kamp-Bülten”, Neubaumt der Technischen Hochschule* (Enlargement Plan for the Braunschweig University – Areas “Langer Kamp-Bülten”, new construction of the Technische Universität) (picture 5)<sup>24</sup>. According to this Plan, the Langer Kamp area houses the Mechanical Institutes, in the south of Bülten are placed the Institutes for Construction, in the north the Scientific Institutes and, between the two zones, a sport area is placed.

In the Partial Plan of **1961**, relative to all the University area, (picture 6)<sup>25</sup> there's the differentiation, through different crosshatches, among the realized buildings, the ones in progress and the ones at the design stage. The planning of the future realizations (in the years 1960-1964) is indicated according to the urgencies. This Plan is very important, since it has been drawn up after the Scientific Council Recommendations (advices given to all the Universities under construction after the war, in order to indicate the potential difficulties and the specifications for each Institute about dimensions and necessities).<sup>26</sup> In this Plan, the Institute for Piston Engine is very different than in the previous one (picture 5) and it appears to be much more similar to the actual realization, except for the garages building position in relation with the other buildings (in the Plan it isn't aligned with the laboratories). Therefore, it belongs, in the

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<sup>21</sup> People question, now, on the effective benefit of arranging the buildings for any change, so that to be potentially replaceable in all their elements, both inside and outside. Gesamtplanung der Technische Niedersächsische Hochschulbaugesellschaft 1966, p. 192.

<sup>22</sup> Pump-Uhlmann (1995), p. 746.

<sup>23</sup> Gesamtplanung der Technische Niedersächsische Hochschulbaugesellschaft 1966, p. 9.

<sup>24</sup> In the archival investigation at page 215.

<sup>25</sup> In the archival investigation at page 216.

<sup>26</sup> Pump-Uhlmann (1995), pp. 750-751.

legend, to the buildings realized after the Recommendations (fourteen buildings have been realized according to them)<sup>27</sup>.

After three months from this new University Plan, the Municipality changes the land-use Plan on the basis of this one.<sup>28</sup> The necessity of conforming each other the two Plans is given by the thought of future possible problems due to the changes that can occur in the buildings; this conformation is obtained by ensuring the most effective balance among the plans for the future developments. The Recommendations of the Scientific Council are determinant, in some way confirming what already indicated by the Plan: besides the specific indications for some buildings, there is the recommendation of always planning the modalities for future enlargements of a building and of getting the administrative buildings stronger in order to make possible the rapid implementation. They are schematized in the form of tables. In addition to the particulars about costs and dimensions of each building, a chronological order for the realization of the different buildings is also described.<sup>29</sup> In the Recommendations it is also reported the lack of adequate experts and the consequent marginalization of Braunschweig city.

In the plans there are no particular limitations, but the main difficulty to face is given by the economic limitations (because of the war and the impending need of rebuilding lots of houses and public buildings). Besides the planned area is under-sized: according to the city Plan of Use, the actually usable space for the Braunschweig University buildings, excluding the other public functions (industrial, commercial and residential planned in the area) is limited to 53 ha.<sup>30</sup> By comparing this surface with the one at disposition for the expansion of the Stuttgart University (as example) it is noted how much the area in Braunschweig is under-sized since in Stuttgart, which has quantitatively the same requirements than Braunschweig, the planned usable space is of 191 ha.<sup>31</sup>

With the new University Campus, the city image has completely changed. In fact the Campus areas are structured as extended green areas scattered by important volumes

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<sup>27</sup> *ivi.*

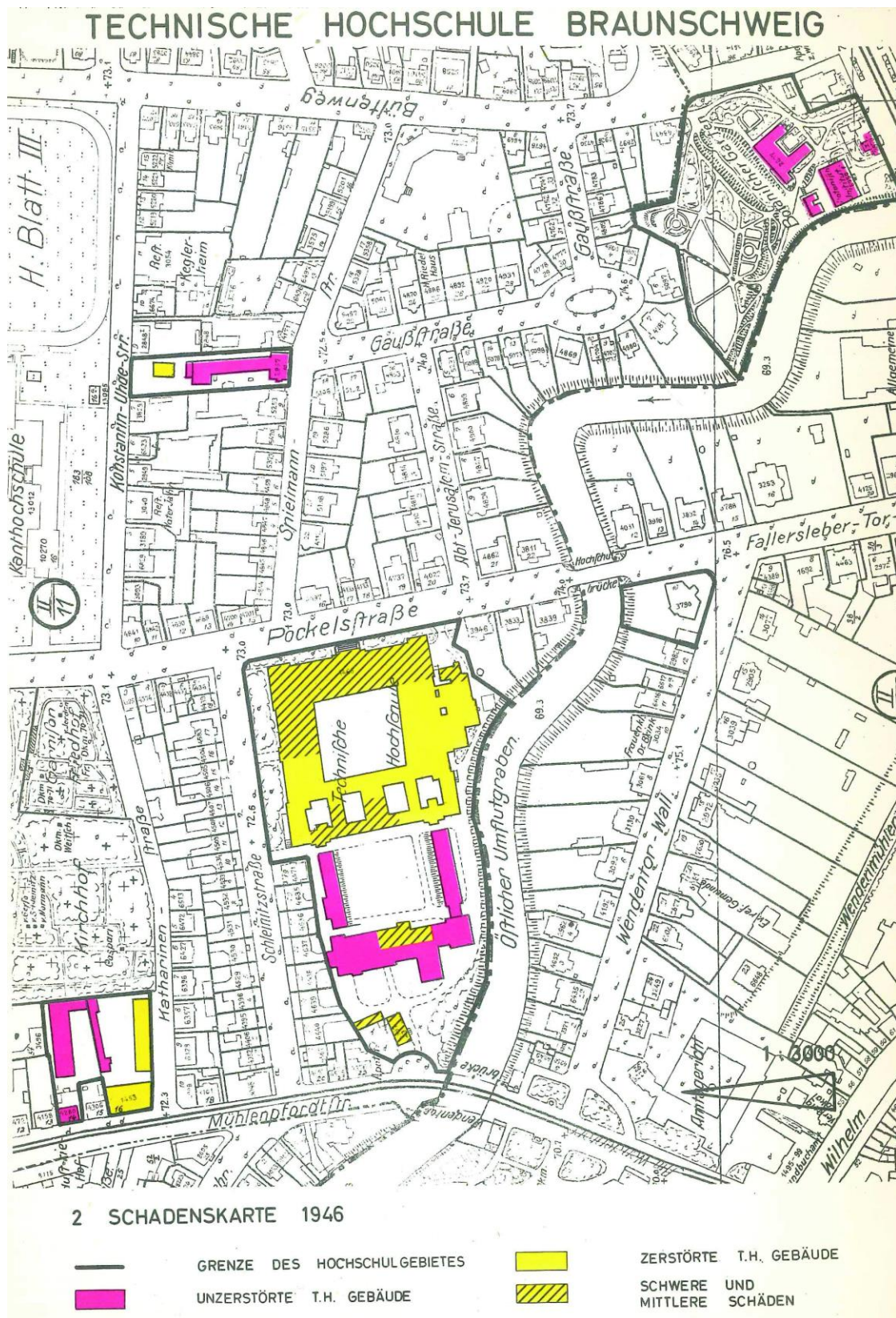
<sup>28</sup> Gesamtplanung der Technische Niedersächsische Hochschulbaugesellschaft 1966, pp. 200-203.

<sup>29</sup> *ibidem*, pp. 9-21

<sup>30</sup> *ibidem*, p. 20

<sup>31</sup> *ivi.*

and they overcome spaces never built so far. For realizing the new University buildings in 1964 8 million Marks have been spent, a very low number if compared to the initial estimate of 500 million.

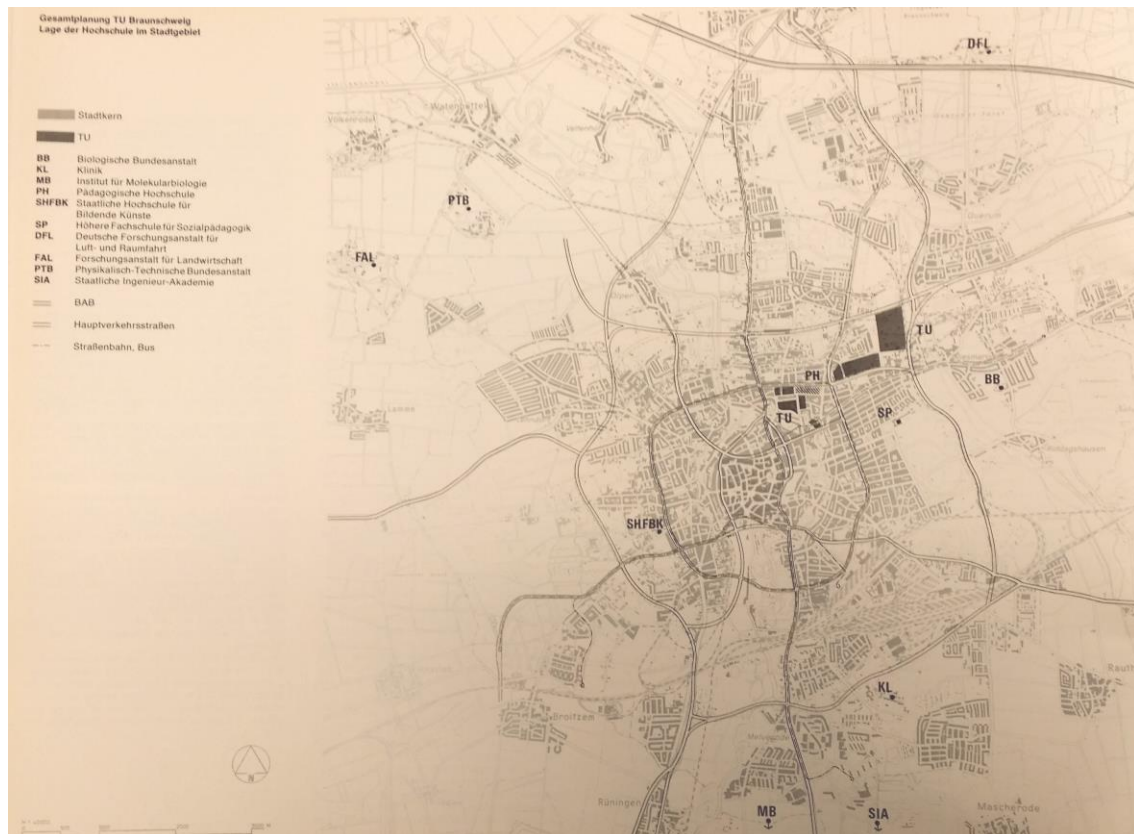


1: From the first Braunschweig City Plan (1946)

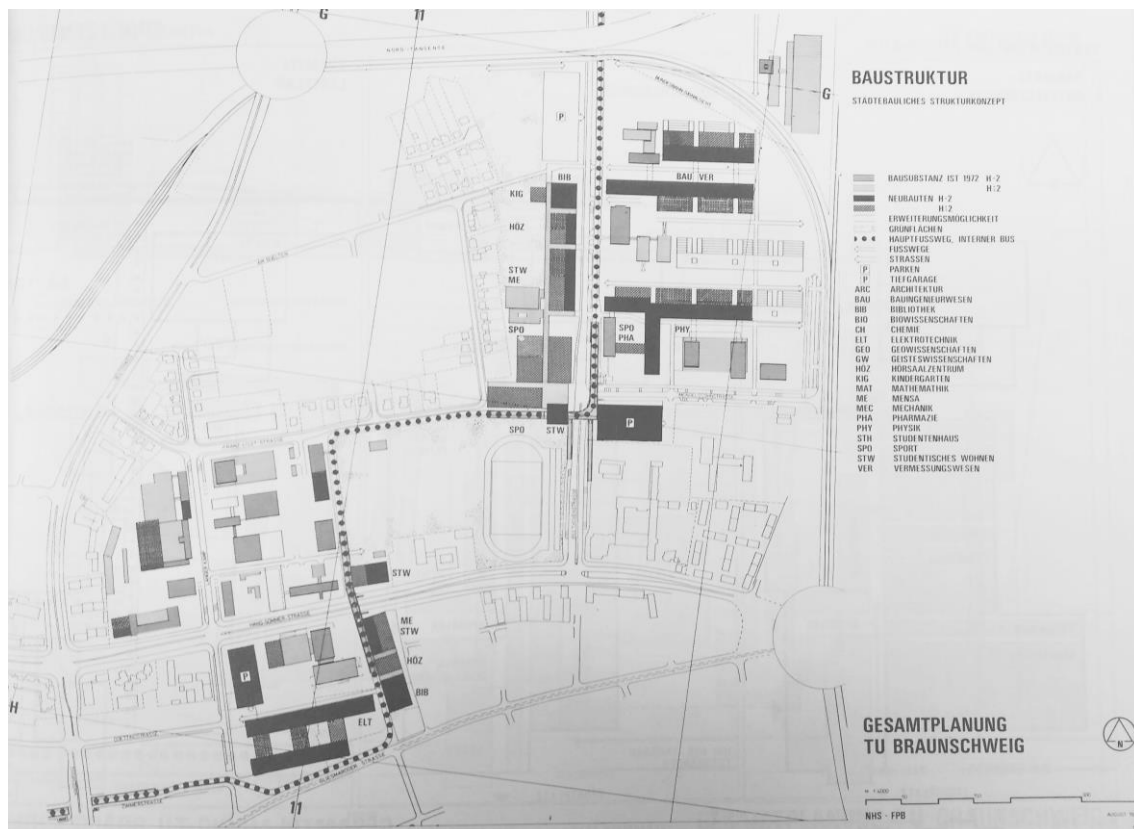








3: Braunschweig City Plan (1952). In the archival investigation, p. 218.

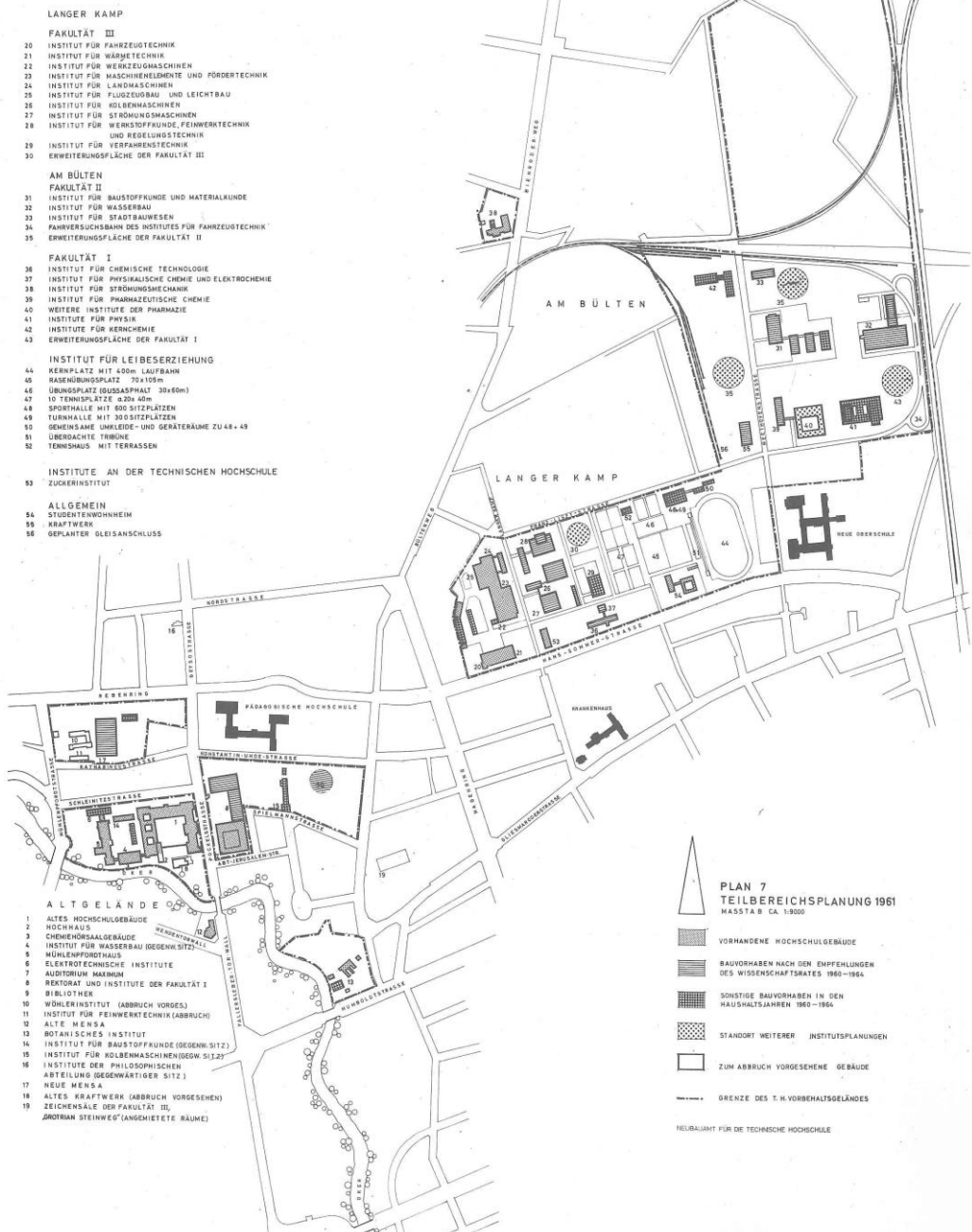


4: Braunschweig University Plan with future expansion of buildings. In the archival investigation, p. 219.

[illegible]

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# TECHNISCHE HOCHSCHULE BRAUNSCHWEIG



6: Partial Plan concerning the University area (1961). In the archival investigation, p. 216.

### 3.2 The designer: Walter Henn

In the sheets the figure of Walter Henn is discussed:

in the bibliographical investigation, through the publications concerning the designer his projects and made by himself (pp. 162-184).

Cultural context. Walter Henn is born in 1912 in Dresden where his education and first professional experiences also occur.<sup>32</sup> In the first years of his education, while he attended the High School specializing in humanities, he was interested in graphic and music. After the school he chose the Faculty of Civil Engineering. During the University years, he became assistant of his professor Otto Kirschmer in the Department of hydraulic. Kirschmer has been one of his masters, who helped him in the education and in leading him towards the professional career. In the same field of the hydraulic engineering, he obtained also the PhD but, at the same time, he started attending the Master in Architecture, since his aim was being both a technical and an artist. In the architectural formation, his main master has been Wilhelm Kreis. Both Kirschmer and Kreis have introduced Henn in the profession and in teaching. Henn remains in Dresden until 1953, when he moves to Braunschweig. The whole experience gathered till the moving in Braunschweig in different fields and sectors (from the professional work to the work in companies and in the university) were an advantage for Henn and allowed him to be chosen among other colleagues.<sup>33</sup>

In Dresden. Henn takes part to the War and he got injured on the eyes. After healing, he can start again working at the University thanks to the Kirschmer help. In the years after the war, Henn gives assistance in the city rebuilding and, in particular, in the new University constructions, working side by side with the architect Karl Wilhelm Ochs.<sup>34</sup> Their works are characterized by a special attention to the detail. In these years, Henn becomes known in the Saxony region, because of some projects of rebuilding and because of his first important publications, so that he starts having the first contacts with the local professionals. As regards the rebuilding of the University Campus, Henn

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<sup>32</sup> For Henn's biography and cultural context, please refer to Buttolo, Susann: Walter Henn – Eine Architektenkarriere, in: Buttolo, Susann; Lippert, Georg (eds.): Walter Henn – die Ästhetik und des Funktionalen. Thelem, Dresden 2012, p. 25-45.

<sup>33</sup> Lippert Hans-Georg: Walter Henn und die Nachkriegsmoderne in der Architektur, in: Buttolo, Susann; Lippert, Georg (eds.) 2012, p. 89.

<sup>34</sup> Buttolo, Susann: Walter Henn – Eine Architektenkarriere, in: Buttolo, Susann; Lippert, Georg (eds.) 2012, pp. 34-37.

deals both with the urban planning and with the Institutes construction. Exactly in that years however (from 1950), the “Charter of the sixteen Principles for the Urban Planning” enters into force in the East Germany (GDR): it consists of the regulation for all the future buildings, which have to follow the national architectural tradition. This Charter, together with the new Construction Act, strongly influence the new Dresden University and all the architects’ projects.<sup>35</sup> Henn has been able to find a compromise between tradition and innovation in his projects, without tripping in the baroque architecture.<sup>36</sup> In the rebuilding of ancient buildings destroyed by the war, Henn has affirmed, since in 1946, that even a ruined construction deserves to be preserved, being a document of a culture.<sup>37</sup>

In Braunschweig. In the years after the War, in Dresden Henn feels the strong lack of democracy and the possibility to be controlled by the policy. For this reason he starts thinking to move in the West Germany already in 1951, looking for contacts which could help him. The main help comes from Friedrich Wilhelm Kraemer, an architect living in Braunschweig and assistant of the professor Carl Mühlenpford, who offered Henn to take the place of the professor Petersen in the Institute of Building Construction.<sup>38</sup> Henn was chosen because his dual education in architecture and engineering and he moved to Braunschweig between 1952 and 1953, together with his family. The political situation in the East Germany in those years was becoming more and more difficult.<sup>39</sup> In the new political and cultural context, Henn is free to experiment the contemporary architecture and to put in practice his technical and architectural knowledge and experience.<sup>40</sup>

The Braunschweiger Schule<sup>41</sup>. After moving to Braunschweig in 1953, Walter Henn together with Friedrich Wilhelm Kraemer (1907-1990) and Dieter Oesterlen (1911-

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<sup>35</sup> *ibidem*, p. 36.

<sup>36</sup> For the Henn’s architecture in Dresden see Zaskhe, Kerstin: Die verhinderte Moderne. Die Planungen für den Campus der TU Dresden, in: Buttolo, Susann; Lippert, Georg (eds.) 2012, pp. 47-65.

<sup>37</sup> As explained by Henn in ist first fundamental book: Henn, Walter: Der Sicherung und der Wiederaufbau historischer Bauwerke. Eine Betrachtung praktischer Denkmalpflege, in: Baumeister, 45. Jg, 1948, 9, p. 305.

<sup>38</sup> Buttolo, Susann 2012, pp. 38-41. See also Wilhelm, Karin: Gesetz und Freiheit, in: Wilhelm, Karin et. al. (eds.): Gesetz und Freiheit. Der Architekt Friedrich Wilhelm Kraemer (1907-1990). Jovis, Berlin 2007, p. 17.

<sup>39</sup> Buttolo, Susann 2012, p. 40.

<sup>40</sup> Lippert Hans-Georg 2012, pp. 81-82.

<sup>41</sup> In the bibliographical investigation, p. 195-197.

1994) give life to a triumvirate which has the task to train the students.<sup>42</sup> The Braunschweig School is operative from the end of 1950s to the end of 1960s. The characteristic of their approach is the union between education and training. Since they have three very different backgrounds, the result of their education is an elegant and functional architecture, which clearly refers to the international one. Kraemer was the first architect who gives life to the school: he had studied in Braunschweig and, until the first years of 1950s, he didn't want relationships with other contemporary architects or architectural movements (like the Weimar ones). Then the main influences come from Mies van der Rohe, Arne Jacobse, Walter Gropius, Eero Saarinen, Alvar Aalto, Ralph Erskine and Le Corbusier.<sup>43</sup> He dealt both with the rebuilding of the old city and with the realization of contemporary buildings. Oesterlen arrives in Braunschweig in 1953 and he is considered the architect of the reconstruction.<sup>44</sup> Kraemer is the rationalist, Oesterlen the idealist while Henn is the one who deals with the constructive aspects: together they realize the synthesis among construction, form and function. The school has had a very "revolutionary" role in an effort both to mentally reorientate the university education distancing from the National Socialist ideology and realizing physically such a renovation through the realization of new university buildings.<sup>45</sup> The University sector, in fact, represents a precious opportunity for re-orienting the minds and for changing the image of the destroyed cities by the war. Among the activities pursued by the Braunschweiger Schule the study trips are included, organized starting from 1951 to Scandinavia, Finland and America.<sup>46</sup> In this way, the international architecture influences the Braunschweig architecture, which is characterized by a synthesis between regionalism and modernisation. The most significant buildings of the school are: the Kaufhaus, realized in 1950 by Kraemer and changed in 1958 that represents the first "curtain wall" realized in German; the University Mensa realized by

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<sup>42</sup> Please refer to: Buttolo, Susann; Lippert, Georg (eds.) 2012, p. 7 (introduction); Brundenburger, Dietmar: Walter Henn und die „Braunschweiger Schule“, in Buttolo, Susann; Lippert, Georg (eds.) 2012, pp. 106-119 and to Schmiechen-Ackermann, Dettlef; Otte, Hans; Brandes (eds.), Wolfgang: Hochschulen und Politik in Niedersachsen nach 1945. Wallstein Verlag, Göttingen 2014, pp. 41-52.

<sup>43</sup> Pump-Uhlmann (1995), pp. 747-748. von Kienlin, Alexander; Gisbertz, Olaf; Hoyer, Sebastian: „Braunschweiger Schule“ – Ergebnisse und Perspektiven der Bauforschung für junge Baubestände 1945+. Beitrag zum Tagungsband der Koldewey Gesellschaft 2016 (Innsbruck 4-8 May).

<sup>44</sup> Brundenburger, Dietmar 2012, pp. 108-113.

<sup>45</sup> Wilhelm, Karin: „Mut zur Selbsterziehung“ – Das Hochschulforum von Friedrich Wilhelm Kraemer als programmatische Stadtraumfigur, in Gisbertz, Olaf (eds.): Nachkriegsmoderne kontrovers - Position der Gegenwart. Jovis, Berlin 2012, pp. 73-75.

<sup>46</sup> *ibidem*, p. 75.

Henn in 1961 but subjected to important enlargements; the University skyscraper realized by Oesterlen in 1952 in the courtyard of the old University building.<sup>47</sup>

Henn's architecture is characterized by a rational monumentality and a purity of the shapes. He can be associated with the contemporary architects Peter von Seidler in Munich, Günter Wilhelm and Curt Siegel (who is also a Henn's friend) in Stuttgart, who contribute to the diffusion of the International Style in Germany.<sup>48</sup> All of them share the idea of a modern architecture whose shape is based on the technical conditions and necessities, without any formalism<sup>49</sup>. The best model for this concept is the American architecture where also European ideas (exported by Walter Gropius, Mies van der Rohe) have had the possibilities to be developed during the war years.<sup>50</sup> A great role for the diffusion of the American architecture is played by the Government itself, which promote a re-education of the German people through the distribution of books and journals, the organisation of exhibitions and of study tours for architects and researchers.<sup>51</sup>

Henn is particularly influenced by the American architecture, as it is possible seeing in the office buildings of the Machine Factory Friedrich Deckel and the Osram Administration, both of them in Munich<sup>52</sup>. Here the open offices are one of the main characteristic,<sup>53</sup> with the aim to make the buildings as much flexible as possible.<sup>54</sup> Very important for him and his colleagues of the "Braunschweiger Schule" Kraemer and Oesterlen, have been exactly the study trips. Henn visited the United States in 1955 for the first time together with Kraemer, on the occasion of the conferment of the Honorary Doctorate to Mies van der Rohe in Chicago.<sup>55</sup> Then he returned two times more for

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<sup>47</sup> Brundenburger, Dietmar 2012, p. 116.

<sup>48</sup> Lippert Hans-Georg 2012, p. 82.

<sup>49</sup> As explained particularly in the Curt Siegel main book: Siegel, Curt: Strukturformen der modernen Architektur. Callwey, Munich 1960.

<sup>50</sup> Lippert Hans-Georg 2012, p. 83.

<sup>51</sup> *ivi*.

<sup>52</sup> For the Machine Factory Friedrich Deckel please refer to Henn, Walter: Maschinenfabrik in München, in: Bauen + Wohnen= Construction + habitation = Building + home: internationale Zeitschrift, 16., 1962, 5, pp. 197-202. For the Osram centre please refer to Henn, Walter: Zentrale Forschung und Entwicklung der Osram GmbH in München, in: Bauen + Wohnen= Construction + habitation = Building + home: internationale Zeitschrift, 22., 1968, 7, pp. 237-239. In the bibliographical investigation, respectively, at pp. 170 and 179.

<sup>53</sup> About the open offices, see the article written by Henn: Henn, Walter: Bürogrossraum und Architekt, in: Baumeister, Jg. 7. 1962, pp. 655-666.

<sup>54</sup> Buttolo, Susann 2012, p. 25

<sup>55</sup> Lippert Hans-Georg 2012, p. 83.



study trips organized by the Aluminium Company of America. The last one, in 1959, has been particularly important as described in the relation made by Friedrich Tamms (who took part to the trip together with other colleagues) where he indicates the iconic buildings.<sup>56</sup> The main fields in which the principles of the American architecture emerge are the administrative and industrial buildings.<sup>57</sup> In particular Tamms underlines the Reynolds Metals Company Head Office in Richmond, built between 1955 and 1958 and its effect in the night and in the green, and the General Motors Technical and Research Center in Warren (Michigan) realized by Eero Saarinen between 1946 and 1956.<sup>58</sup> Henn and Kraemer too were impressed by the Saarinen General Motor, which they saw still under construction.<sup>59</sup> The complex can be considered an “University for cars”<sup>60</sup>, designed at a car dimension, becoming itself and its design conception a model for further buildings for research and production, in particular for the Henn’s industrial and university buildings realized in Braunschweig.<sup>61</sup> The Saarinen building is designed according to some principles: the flexibility of the inner space, artificial light and ventilation, the attention for the workers with the consequent creation of a pleasant working environment in contact with nature<sup>62</sup> and the distance from the city. One of the aspects which most of all fascinated Walter Henn was the realization of the American buildings as if they were machines, as a result of the standardisation and digitisation of the architecture.<sup>63</sup> The great news that these American buildings bring to the Europe concern that: the production buildings are flexible, with one floor, with a free inner space, with open-space offices and they are artificially illuminated and ventilated.<sup>64</sup>

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<sup>56</sup> Tamms, Friedrich: *Architektur und Städtebau in den USA*, in Aluminium-Zentrale e. V (eds.): *aaa* (I). Reisebericht Aluminium in den Architektur USA, Düsseldorf 1960, pp. 24-25.

<sup>57</sup> See the article written by Henn himself about the american architecture: Henn, Walter: *Neue Industriebauten in den Usa*, in: *Zentralblatt für Industriebau*, 3. Jg, 1957, 10, pp. 341-346.

<sup>58</sup> For the Eero Saarinen architecture, one of the main model for the Henn’s architecture, refer to: Merkel, Jayne: *Eero Saarinen*. Phaidon Press Limited, London 2005; Serraino, Pierluigi: *Eero Saarinen 1910-1961. Ein funktionaler Expressionist*. Taschen, Köln 2005; De Long, David G.; Peatross, C. Ford (eds.): *Eero Saarinen: buildings from the Balthazar Korab archive*. Norton & Company, London, New York 2008 and Pelkonen, Eeva-Lüsa; Albrecht, Donald (eds.): *Eero Saarinen. Shaping the future*. Assa Abloy, New Haven 2010.

<sup>59</sup> Wilhelm, Karin: *Atmosphären aus Übersee*, in: Wilhelm, Karin; Gisbertz, Olaf; Jessen-Klingenberg, Detlef; Schmedding, Anne (eds.): *Gesetz und Freiheit. Der Architekt Friedrich Wilhelm Kraemer (1907-1990)*. Jovis, Berlin 2007, pp.80-86.

<sup>60</sup> Tamms, Friedrich 1960, p. 29.

<sup>61</sup> Lippert Hans-Georg 2012, p. 89.

<sup>62</sup> This aspect is then reformulated by Henn in: Henn, Walter: *Bauten der Industrie*, vol.1, *Planung - Entwurf – Konstruktion*. Verlag Georg D.W. Callwey, Munich 1955.

<sup>63</sup> Henn, Walter: *Planen und Bauen in USA*, in: *Baumeister*, 3. Jg., 1957, p.4.

<sup>64</sup> Lippert Hans-Georg 2012, p. 86.

Henn deals almost exclusively with the industrial buildings and he applies the related principles to other typologies, in particular to the university architecture<sup>65</sup>. He focuses his research and main publications on the industrial design since he believes that it represents the most favourable situation for experimenting the new techniques: in fact it depends on the new technologies and it is free from tradition; in this respect, it reflects the characteristics of the contemporary time.<sup>66</sup> The most influence of his thought concerning the industrial buildings comes from the American architecture with which he shares, in particular, the idea of a designing not only based on the production, but also taking into account the wellness of the workers.<sup>67</sup> According to him, the industrial buildings are become first of all spaces for living for a lot of people. They depend on all the personal, social and state relationships. The shape of the industrial buildings has to be promoted so that it becomes expression, through the technology, of the work respect.<sup>68</sup>

Henn is well known in the field of the industrial designing also because he has published many books and handbooks that have been translated in many languages, becoming points of reference for all the designers facing the realization of new industrial buildings and for all the students interested in their planning. According to Henn, for the development of the inner space in the industrial architecture, the determining factor is the production process, so that the space arrangement is influenced by the type of housed equipment and machines.<sup>69</sup> The consequence is that the industrial buildings are no more human-sized, but the measure of the space becomes the machine. The constructive system also determines the aspect of an industrial building. Besides Henn prefers the realization of one-floor buildings, having all the production under the same roof and, if it is necessary having more buildings, they have to be connected realizing a complex.<sup>70</sup> In general Henn has a holistic design conception, given by the combination of aesthetics with technical and constructive

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<sup>65</sup> One of the main example in this regard is the Mensa of the Braunschweig University, whose trajectory of the food derives from the organization of the production trajectory in the industrial architecture. See in the bibliographical investigation at page 175.

<sup>66</sup> "The industrial buildings have become first of all spaces for living for a lot of people. They depend on all the personal, social and state relationships. The shape of the industrial buildings has to be promoted so that it become expression, through the technology, of the work respect". Cfr. Henn, Walter: *Bauten der Industrie*. Callwey, Munich 1955, pp.13-14. Translation made by Laura Nardi.

<sup>67</sup> Henn, Walter<sup>C</sup>: *Industriebau und Architektur*, in: *Baumeister*, 52. Jg., 1955, 9, pp. 569-575.

<sup>68</sup> cfr. Henn, Walter<sup>A</sup> 1955. Translation made by Laura Nardi.

<sup>69</sup> *ibidem*

<sup>70</sup> Henn, Walter<sup>A</sup> 1955, pp.16-17.

aspects;<sup>71</sup> but a peculiarity of the industrial buildings remains their correlation with a determined function.<sup>72</sup>

Significative industrial buildings<sup>73</sup> realized by Henn are<sup>74</sup>:

the Siemens & Halske AG in Braunschweig (picture 7), realized between 1955 and 1957 with its characteristic shed roof and yellow bricks cladding;<sup>75</sup>

the Brunsviga Machine Factory in Braunschweig (picture 8), realized between 1956 and 1957 with its characteristic concrete structure on sight and bricks cladding which is very similar to the walls of the case study also because they share the double layer of bricks with an air space in-between;<sup>76</sup>

the Friedrich Deckel Precision mechanics and mechanical engineering in Munich (picture 9), realized between 1956 and 1962 which has been realized in order to guarantee a future extensibility, with the production hall in concrete and the administrative building in steel;<sup>77</sup>

the Power station of Siemens-Shuckert in Wesel (picture 10), realized between 1957 and 1958 in concrete frame on sight and infilled by glass walls of different feature;<sup>78</sup>

the High Voltage Test Field in the Siemens City in Berlin (picture 11) realized between 1959 and 1960, a complex of buildings with different functions made by a reinforced

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<sup>71</sup> Buttolo, Susann; Lippert, Georg (eds.) 2012, p. 7 (introduction).

<sup>72</sup> Henn, Walter<sup>C</sup> 1955, pp. 569-575.

<sup>73</sup> Here "significant buildings" is related to the case study and means the buildings realized in the same period of the case study, presenting important characteristic or innovations that could have influenced it.

<sup>74</sup> They are described in the bibliographical investigation, pp.165-182 (each building with a dedicated sheet).

<sup>75</sup> See Henn, Walter: Internationale Beispiele. Callwey, Munich 1962, pp. 188-189; Buttolo, Susanne; Lippert, Georg (eds.) 2012, pp. 151-153 and the journals Deutschebauzeitschrift, 1962, 9; Zentralblatt für Industriebau, 1958, 4. In the bibliographical investigation, at page 168.

<sup>76</sup> See Henn, Walter<sup>B</sup> 1962, pp. 176-177, Buttolo, Susanne; Lippert, Georg (eds.) 2012, pp. 154-157 and the journals Baumeister, 1957, 10; Zentralblatt für Industriebau, 1958, 2 and Deutschebauzeitschrift, 1962, 9. In the bibliographical investigation, at page 169.

<sup>77</sup> see Buttolo, Susanne; Lippert, Georg (eds.) 2012, pp. 158-163 and the journals Bauen+Wohnen, 1964, 19; Deutschebauzeitschrift, 1966, 9; Stahlbau, 1964, 2; Deckel-Echo, 1957, 4. In the bibliographical investigation, at page 170.

<sup>78</sup> see Buttolo, Susanne; Lippert, Georg (eds.) 2012, pp. 164-167 and the journal Baumeister, 1961, 10. In the bibliographical investigation, at page 171.

concrete structure on sight and bricks cladding, with the characteristic big testing hall, whose shape directly derives from the tension circle developing during the tests;<sup>79</sup>

the Blaupunkt Factory in Salzgitter (picture 12), realized between 1959 and 1960 whose shape and dimension derives from the assembly line organization and for which different materials are used (both prefabricated concrete and reinforced concrete frame with bricks cladding);<sup>80</sup>

the Siemens-Schuckert House of designers in Mülheim/Ruhr (picture 13), realized between 1958 and 1960 around a courtyard and with a concrete-frame structure and bricks or glass cladding;<sup>81</sup>

the Production Hall of Varta Ag in Hagen (picture 14), realized between 1962 and 1963 which is extremely flexible for any future development of the machine thanks to the use of prefabricated elements with a structure in concrete<sup>82</sup>;

the central Warehouse and Social building of the City Factory in Braunschweig (picture 15), realized between 1963 and 1964 that are completely different: the first one in steel ties covered by a steel sheet, the second one in concrete frame with brick cladding;<sup>83</sup>

the Production building of the Aerzen Machine Factory in Aerzen (picture 16), realized between 1962 and 1963 in order to face the requirement of a flexible building so that it consists of a steel mountable structure which simplifies the inner organisation of the spaces and is easy to be changed; three facades are covered by clinker bricks while one façade is in concrete blocks easily dismountable.<sup>84</sup>

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<sup>79</sup> see Henn, Walter<sup>B</sup> 1962, pp 326-327, Buttolo, Susanne; Lippert, Georg (eds.) 2012, pp. 168-171 and the journals *Bauwelt*, 1962, 9; *Betonbau des Inlandes*, 1963, 10 and *Zentralblatt für Industriebau*, 1966, 5. In the bibliographical investigation, at page 172.

<sup>80</sup> see Buttolo, Susanne; Lippert, Georg (eds.) 2012, pp. 172-175 and the journal *Baumeister*, 1961, 10. In the bibliographical investigation, at page 173.

<sup>81</sup> see Buttolo, Susanne; Lippert, Georg (eds.) 2012, pp. 176-179 and the journals *Deutschebauzeitschrift*, 1966, 9; *Zentralblatt für Industriebau*, 1965, 4 and 9. In the bibliographical investigation, at page 174.

<sup>82</sup> see *Baumeister*, 1964, 11 and 1967, 10; *Siporex-Information*, 1966, 8; *Deutschebauzeitschrift*, 1967, 4; *Zentralblatt für Industriebau*, 1970, 5. In the bibliographical investigation, at page 177.

<sup>83</sup> Buttolo, Susanne; Lippert, Georg (eds.) 2012, pp. 201-203 and the journals *Deutschebauzeitschrift*, 1967, 4; *Bauen + Wohnen*, 1965, 8 and *Zentralblatt für Industriebau*, 1966, 9. In the bibliographical investigation, at page 178.

<sup>84</sup> see the journals *Baumeister*, 1964, 11; *Deutschebauzeitschrift*, 1967, 4; *Zentralblatt für Industriebau*, 1966, 11 and *Bauen + Wohnen*, 1964, 5. In the bibliographical investigation, at page 180.

From the significative industrial buildings designed by Walter Henn, here considered, it emerges<sup>85</sup> that one of the constants is the need of flexible and easily transformable buildings. Henn faces these requirements in different ways, showing also the desire to experiment different solutions with different materials (once with a concrete frame structure, once with a steel structure, once with a traditional realization, once prefabricated)<sup>86</sup>. Each solution gives a different result, not only functional, but also aesthetic. Since each building is in some way representative of an industry, Henn designs a different image for each building, meeting different (but similar) needs in a variety of ways. Henn personalizes also the technical devices related to the inner function, defining in detail the specific technique or mechanism (in this respect the drawings published in the specialist magazines of the time are very important and precious for understanding the innovations that Henn introduces for each building and they allow a comparison among them). Very recurring is the combined use of a concrete structure frame and a bricks cladding, which is the same solution adopted for the case study.

One of the most emblematic buildings among the listed that is related to the Institute for Piston Engine is the Brunsviga Machine Factory in Braunschweig<sup>87</sup>. Not only it is placed in the same geographical context, but it has been also built in the same historical period (just few years before) and with the same materials and structure. In particular with reference to the cloakroom: very similar to the Institute is the structure in reinforced concrete that in the central part of the two northern and southern facades is on sight. The cladding consists of a double layer of bricks with an air void in-between (like for the Institute of Piston Engine). The building is an expansion of an existing complex and it is currently a school in a good state of preservation.

Henn deals also with the University buildings, both in Dresden and in Braunschweig. If in Dresden he is very bound by the politics of the GDR and he is forced to realize very traditional buildings, in Braunschweig he experiments all the latest seen in America and coming from Scandinavia and Finland. He finds difficulties also in Braunschweig,

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<sup>85</sup> For a summary of all the following information, see the bibliographical investigation at page 182.

<sup>86</sup> In the article "Über das alte und das neue Bauen" written by Henn in 1965, he makes a distinction between the steel and the concrete structures, indicating the steel ones able to guarantee a better flexibility and a greater personalization (Henn, Walter: Über das alte und das neue Bauen, in: Akademie der Wissenschaften und der Literatur: Abhandlungen der Mathematisch-Naturwissenschaftlichen Klasse. Jg. 1965, 7).

<sup>87</sup> For a deeper information see the references written in the note<sup>76</sup>.

because of economical limitations and a lack of materials. Moreover he has to face the requirement of a fast reconstruction because of the urgency of building new Institutes for the University, since the number of students was increasing very quickly. In the new University buildings and complexes, Henn pays attention to the specific necessities (technical requirements and functional specifications in particular) and takes into account the guidelines given by the urban and university planning and by the Scientific Council Advices (for the buildings realized after 1960).

Significative university buildings<sup>88</sup> realized by Henn in Braunschweig are:

the TU Main Canteen (picture 17) realized between 1961 and 1962 (contemporary to the Institute for Piston Engine) which serves also as a meeting and studying place. It is a steel and glazed rectangular building surrounded by the green and whose inner organization of spaces, food and people trajectory, are designed by Henn as a factory assembly line. The current state is a result of subsequent changes and addition that have transformed the original shape<sup>89</sup>;

the Institute for Industrial Engineering and Operations Research (picture 18) realized between 1964 and 1966 represents a later example of double Institute compared to the Institute for Piston and Turbo Engine and it is placed in the same Langer Kamp area. It has a concrete frame structure and a concrete cladding, being in this way externally different from our Institute. But inside one of the main spaces is the testing room, which is double-height and designed as an industrial space<sup>90</sup>.

The Institute for Current Engine (picture 19) which is the joined one with the case study so that they form a double Institute<sup>91</sup>. In particular here reference is made to the testing laboratory which is the most similar Henn's building to the case study since it has been built together with it, belonging to the same complex. They share the same materials, structure and way of construction; they differ for the inner organization and for the technical devices linked to the function: the Laboratory for Turbo Engine doesn't

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<sup>88</sup> see the note <sup>73</sup>.

<sup>89</sup> see Buttolo, Susanne; Lippert, Georg (eds.) 2012, pp. 192-195 and the journals Baumeister, 1963, 11; Glasforum, 1966, 6 and Vitrum, 1966, 9-10. In the bibliographical investigation at page 175.

<sup>90</sup> see Buttolo, Susanne; Lippert, Georg (eds.) 2012, pp. 218-22 and the journals Baumeister, 1967, 9; Deutschebauzeitschrift, 1970, 11 and Zentralblatt für Industriebau, 1970, 5. In the bibliographical investigation at page 181.

<sup>91</sup> see the journals Baumeister, 1967, 9; Deutschebauzeitschrift, 1970, 11; Zentralblatt für Industriebau, 1976, 5.

present a so complex ventilation system and a so efficient insulation for the walls, since the testing activity on Turbo Engine doesn't cause pollution or noise. The important devices to consider were the flexibility of the testing room space, without the presence of fixed structures, and the equipment of the fundamental electrical tools. Besides, as in the Laboratory for Piston Engine, the glazed walls, with opaque glass, present a strip of transparent glass at eye level.

In all the analysed buildings realized by Henn the final result is given by the combination of a series of factors, limits and obligations that Henn makes opportunities: the customer specific requirements, the urban planning for the area, the economical limitations, the constant need of flexibility (in particular for the industrial buildings). All the necessities become an excuse for implementing the new knowledge about new materials and ways of construction or for improving the already proven techniques. In fact the Henn's experimentations in architecture, don't concern only the new use of material: sometimes he prefers employing only successfully tested materials since he wants to realize "uneventful" buildings, which are very resistant to the time.<sup>92</sup> At the same time the Henn's buildings are not just limited to meet the specific needs, but they have always a conceptual idea at the basis of the architecture choices which distinguishes the significance of a functional building from that of a simple functional object.

In fact, as it emerges from his books, according to Henn the buildings, in general, never become obsolete, even if old, in contrast to the products (like a radio, a car, a machine).<sup>93</sup> The reason is that the buildings are the result of a combination of factors, all at the same level of importance (the logic of natural shapes, the good practice and the technical arrangement) and that are at the basis of the building significance.<sup>94</sup>

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<sup>92</sup> Buttolo, Susann; Lippert, Georg (eds.) 2012, p. 7.

<sup>93</sup> Henn, Walter: Über das alte und das neue Bauen, in: Akademie der Wissenschaften und der Literatur: Abhandlungen der Mathematisch- Naturwissenschaftlichen Klasse. Mainz 1961/1965, p. 322. You can find the sentence in the bibliographical investigation at page 186.

<sup>94</sup> Siegel, Curt: Strukturformen der modernen Architektur. Callwey, Munich, 1960, p.11.

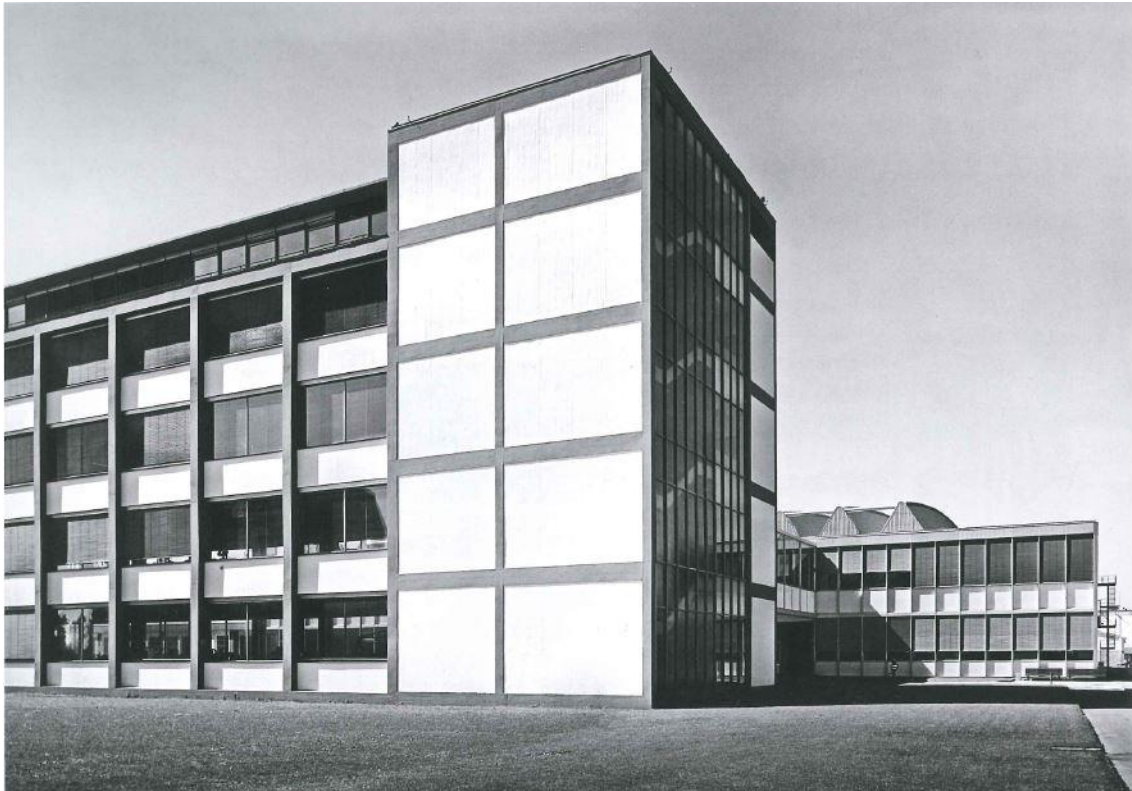


7: Siemens & Halske AG in Braunschweig

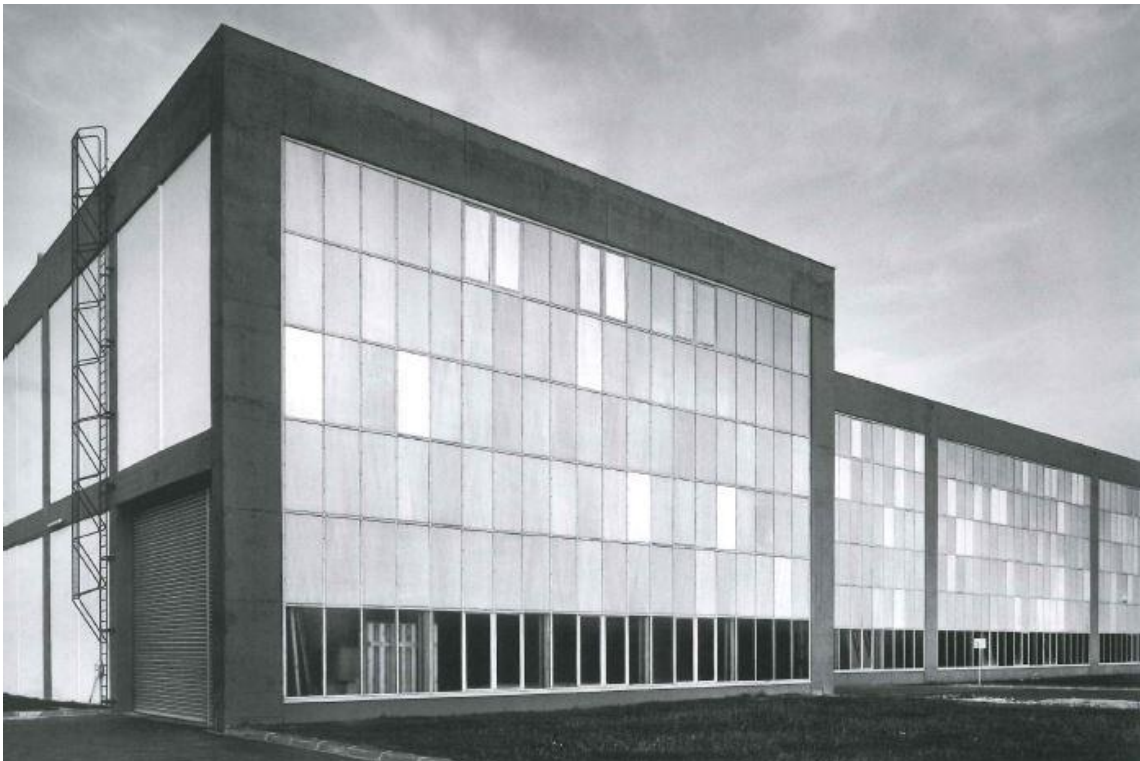


8: Brunsviga Machine Factory in Braunschweig





9: Friedrich Deckel Precision mechanics and mechanical engineering in Munich



10: Power station of Siemens-Shuckert in Wesel



11: High Voltage Test Field in the Siemens City in Berlin

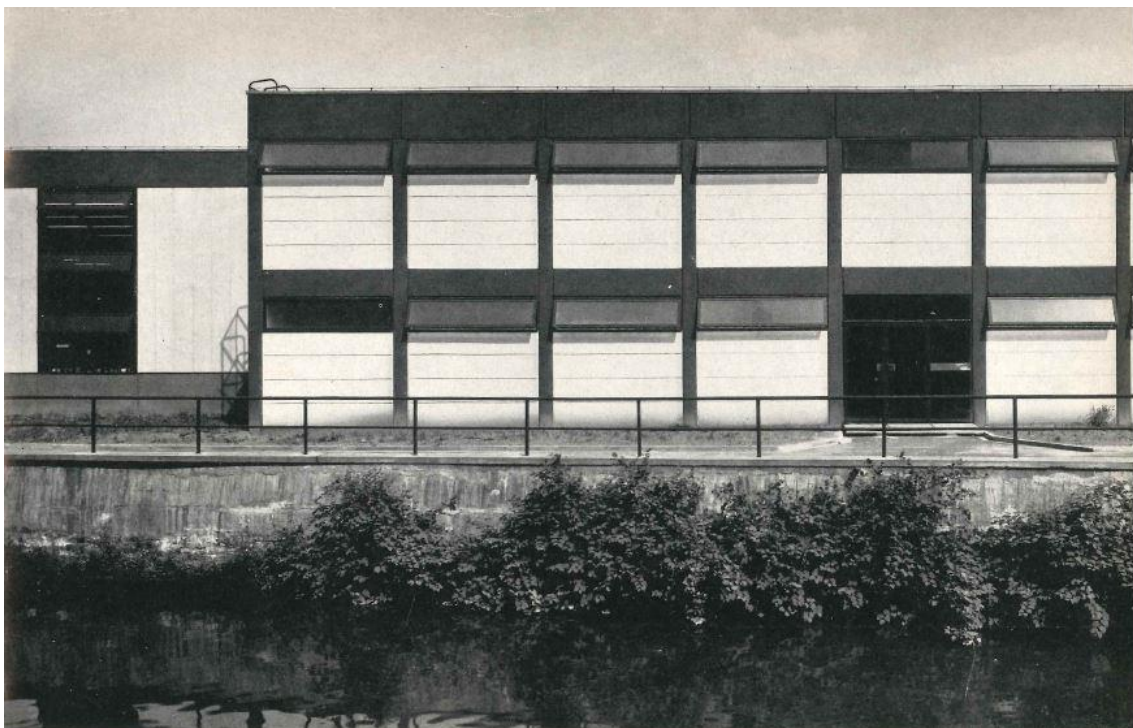


12: Blaupunkt Factory in Salzgitter

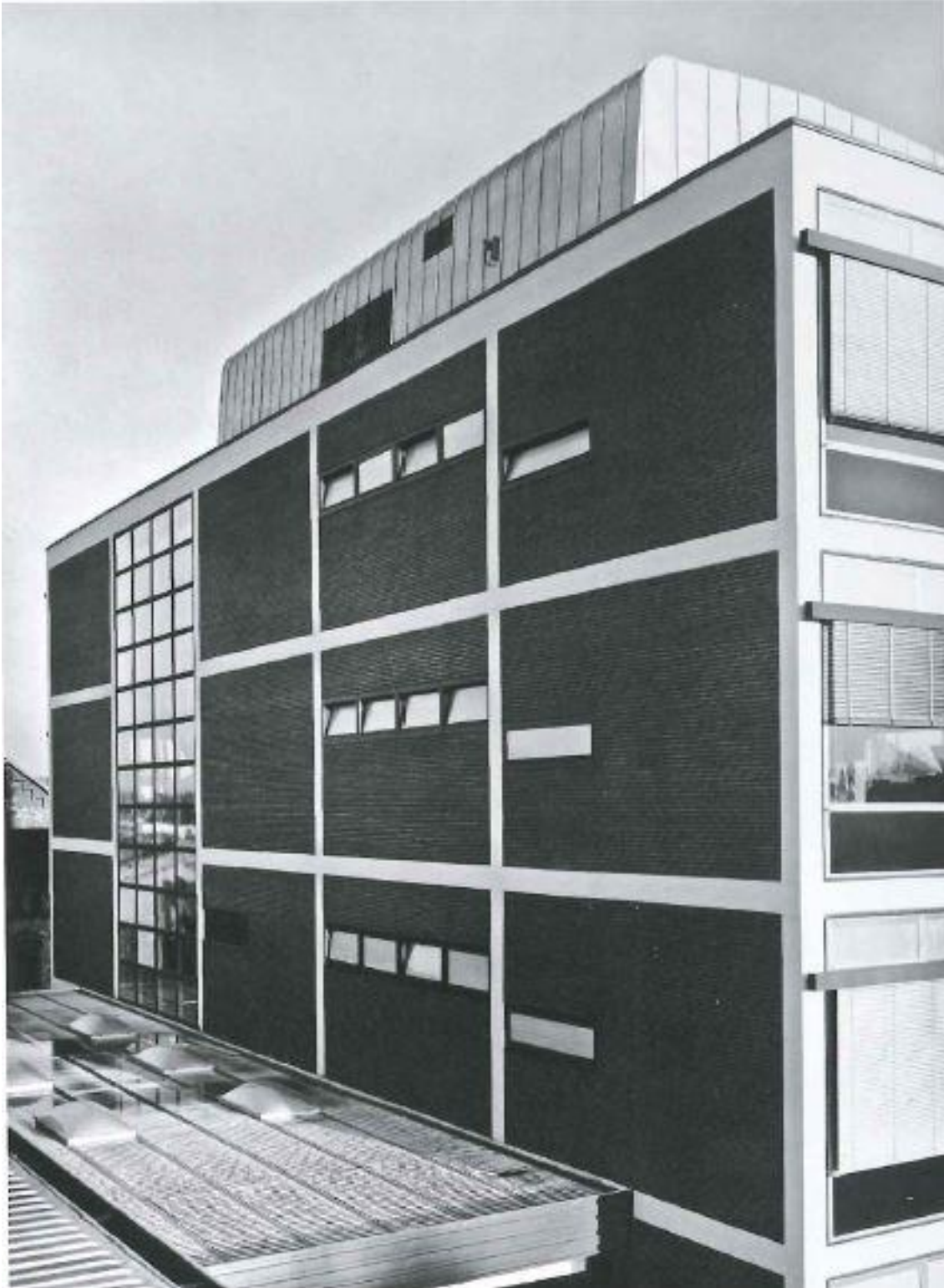




13: Siemens-Schuckert House of designers in Mülheim/Ruhr



14: Production Hall of Varta Ag in Hagen



15: Central Warehouse and Social building of the City Factory in Braunschweig

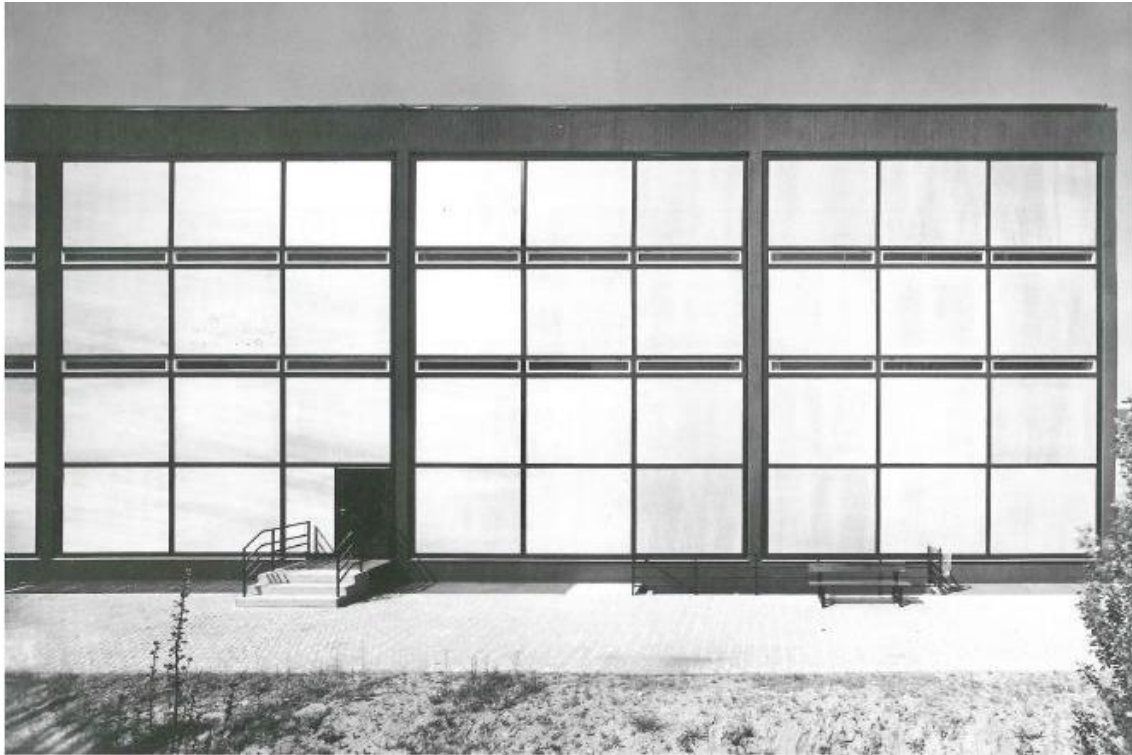




16: Production building of the Aerzen Machine Factory in Aerzen



17: Technische Universität Braunschweig Main Canteen



18: Institute for Industrial Engineering and Operations Research in Braunschweig



19: Institute for Turbo Engines in Braunschweig

### 3.3 The building

In the sheets the aspects concerning the building are discussed:

- in the bibliographical investigation, through the publications concerning the Institute both in books and in journals (pp. 188-189);
- in the archival investigation, through the original drawings analysis (pp. 200-214);
- in the graphical investigation, through the analysis on the drawings resulting from the architectural survey (pp. 224-240) and through the photographs (pp. 241-243)
- in the technical investigation, through the analysis of the materials (characteristics and quality) and the analysis of their decay and relative cause (pp. 245-251)

The Laboratory of the Institute for Piston Engine is one of the four buildings belonging to a complex<sup>95</sup>: as described in the chapter 3.1 about the urban planning characteristics, the building is part of a double Institute, together with the one of Turbo Engine (picture 20), as it happened after the war in the expansion areas for the University. The main building of the complex is the three-floor Administration building and houses the offices, the study rooms, a library and common spaces. These spaces are in common to both the Institutes; for this reason it is placed in a central position and it is connected to both the Laboratories through glazed passages. The three-floors passage (picture 21) leading to the Laboratory of Turbo Engine isn't only a passage, but it also represents the main entrance for both the Institutes, meanwhile the passage leading to the Laboratory of Piston Engine on the ground floor, is one level. The fourth building houses the garages and it is strictly functional to the Laboratory for Piston Engine.

The complex has been designed by Walter Henn in 1960 and realized between 1961 and 1965.<sup>96</sup> Some collaborators contribute in the design process: Willy Janssen, Hans-

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<sup>95</sup> The following description refers to the complex state of art before the beginning of transformation works (started in January 2015.)

<sup>96</sup> The publications regarding the Double Institute is here listed: Institute für Kolbenmaschinen und für Strömungsmaschinen der TH Braunschweig, in: Baumeister, 1967, 9, pp. 1099-1101; Gebäudekomplex der Institute für Kolbenmaschinen und für Strömungsmaschinen der Technischen Universität Braunschweig, in: Zentralblatt für Industriebau, 1970, 5, pp. 203-208; Institute für Kolben- und Strömungsmaschinen an der Technischen Universität Braunschweig, in: Deutsche Bauzeitschrift, 1970), 11, pp. 2133 – 2136; DBZ Gebäudedaten-Institut K+S der TU Braunschweig, in: Deutsche Bauzeitschrift,

Thomas Petersen, Claus Wiechmann and Heine<sup>97</sup>; in particular Petersen and Wiechmann work together with Henn in many other projects in Braunschweig and they become partners of two different architectural firms (Henn+Wiechmann in 1970-1978 and Henn+Petersen in 1970-1980).<sup>98</sup> For the realization 5200 million Marks have been spent<sup>99</sup>. This complex is part of that new University Buildings following the Recommendations of the Scientific Council, even if Henn had already begun its project when the Recommendations became operational.

The double Institute has operated until 2014 when it has been moved in a new building located in an area outside from the Campus University, next to the Braunschweig airport. In 2015 the construction work for the building reversion to the new function (a Laboratory for Emerging Nanometrology called LENA) started and they are going to be concluded in the first months of 2018<sup>100</sup>.

### 3.3.1 The function

The double Institute is a University building and it is part of the Faculty of Mechanical Engineering. The German University is leaning towards a technical and practical education (much more than the Italian University approach, as it will be explained in the second case study). For this reason the different Institutes have specific and suitable spaces functional for the students' and researchers' experimentation activities.

In this sense, the Institute for Piston and Current Engine, like others realized in the same period in the expansion area of the University Campus, not only needed didactic spaces but, in particular, laboratories able to house particular machines and to guarantee all the experimentation activities on them. At the same time, these special

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1976, 5; Institut für Kolben- und Strömungsmaschinen der TH Braunschweig, in: Buttolo, Susann; Lippert, Georg (eds.): Walter Henn – die Ästhetik und des Funktionalen. Thelem, Dresden 2012, pp.196-199, 293; Deutsche Bauzeitschrift (eds.): Bauten für Bildung und Forschung. Museen, Bibliotheken, Institute. Gütersloh 1971, p. 175-178; Das neue Institut für Kolbenmaschinen der Technischen Universität Braunschweig, in: Motortechnische Zeitschrift, 32. Jg., 1971, 3, pp. 73-77.

<sup>97</sup> Buttolo, Susann; Lippert, Georg (eds.) 2012, p.293.

<sup>98</sup> *ibidem*, p.11.

<sup>99</sup> see the table in Gesamtplanung der Technische Niedersächsische Hochschulbaugesellschaft 1966, p. 14.

<sup>100</sup> see <https://www.tu-braunschweig.de/mib/lena/infrastructure/lena-neubau>, accessed on the 17th February 2016.



buildings, shouldn't produce noise and pollution but allow the pursue of the activities in the best conditions both for both the users and the people not directly involved.<sup>101</sup>

The educational activities are housed in the central building of the complex that is shared by both the Institutes and physically connected to them (picture 22). Each Institute, however, has its own laboratory building's which is exclusively destined to the experimental activities (picture 23). Because of their appearance, inner organisation and, most of all, technical devices, they seem to be industrial buildings much more than university ones (picture 24). For this reason the Laboratory for Piston Engines has been defined a "machine building".

In particular, in the laboratory belonging to the Piston Engine Institute, tests on Engine of cars and airplanes are conducted. The aims of these laboratories are: studying how the Engine work, their emissions and the stress of their mechanical components; analysing pressure, temperature, fuel consumption and possible improvements; conducting verifications on oils and greases; looking for alternative fuels, the implementation of innovative engine design, the development of new, more efficient and cleaner combustion processes, the possibility of hybrid propulsion and virtual engine development; test beds for sound insulation and engine ventilation which are integrated as permanent systems into the building<sup>102</sup>. The testing activities conducted in the Laboratory demand a high degree of flexibility in the planimetry organization and in the building height: in fact they can be efficiently performed anywhere in the building and the possibilities that the test equipment to be dismantled, reassembled or moved around fairly often should always be considered. For these reasons, it was decided not to provide fixed testing installations but an extensive power supply system.

These activities cause also considerable noise and pollution, because of the use of oils, fuels and the consequent emission of exhaust gases which are very dangerous especially for those who work there. This set of problems represented for Henn a challenge to face in order to find the best solutions that could guarantee at the same time the execution of the experimental activities and the safeguard of the workers' health.

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<sup>101</sup> In this regard take a look at the document already cited in the note <sup>9</sup> of this chapter (the letter sent on 22.12.1951 by the Rector to Ratsherrn Höft in: Uni BS All: 109-110) in which the Rector explains that people are complaining about the excessive noise coming from the building housing the laboratory, that was previously placed next to the houses and the historical central University building.

<sup>102</sup> [www.Henn.com](http://www.Henn.com) (accessed on the 17th November 2017)

### 3.3.2 The architecture

At planimetrical level the buildings are arranged in a manner that they form an articulated courtyard not completely closed on the side that highlights, compositionally, both a certain separation in respect of the urban context of which the complex is part, and a simultaneous interrelationship among the different constructions. The courtyard is partly defined physically through the buildings, partly perceived through the alignment among the extremities of the buildings themselves. For example, in the planimetry of the project submitted the 10th January 1961, it is evident the intention, expressed through the mark on the ground of the parking spaces placed between the garage building and the Institute for Turbo Engine, to trace and identify, not only physically, the space among the buildings (picture 25)<sup>103</sup>. All the four buildings are rectangular (the Administrative building is 12 by 35 metres, the Turbo Engine Laboratory is 35 by 35 metres, the Piston Engine Laboratory is 34 by 54 metres and the garage building is 7 by 35 metres). From the dimensions, in the recurring of the 35 metres side, it emerges the will to give a geometrical connection among the buildings.

Also in elevation all the constructions are in relation among them thanks to the material composition of the facades: as it is possible to perceive in the drawing representing a whole front of the complex (picture 26)<sup>104</sup>, the alternation between opaque and transparent surfaces of each building is related to the surfaces of the other buildings, so that the same alternation is seamlessly present in the overall front. Each construction then, if considered individually, is related with its surroundings by differentiating each side through different characteristics, without any of the sides to constitute the back of the building. The two experimental laboratories share on the outside the same materials as such as the appearance of the facades, subdivided in modular portions by the structure, which remains on sight. In both the buildings the structure is punctiform type in reinforced concrete, organized according to a frame system on sight, which shows a modular rhythm in the northern and southern facades; the cladding is made up of bricks and, in the eastern and western sides, of big glazed walls. This implicates, for both the laboratories, a same rhythm between structure and cladding and between solids and voids in the fronts equally oriented, resulting in this way consistent with each other, when considering the elevations of the whole complex.

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<sup>103</sup> University Archive, 3306-3309, Lageplan (1960.09.29). In the archival investigation at page 206.

<sup>104</sup> In the bibliographical investigation at page 190.

Different for materials and elevation is the Administrative building, which has also a smaller useful floor area than the laboratories. In this fabric indeed, of three stories above ground, the structure isn't on sight and the walls are completely covered by prefabricated concrete slabs; the windows regularly scan the facades which don't show the same laboratories alternation between solids and voids, but in which the opaque surface prevails: the building looks like it belongs to another complex appearing so unrelated to the matter of the other fabrics connected to it. The small garages buildings is one floor and has a concrete structure on sight with bricks cladding, stylistically recalling the two experimental laboratories (picture 27).

As concerns the specific case of the Laboratory for Piston Engine<sup>105</sup> (picture 28)<sup>106</sup>, it is composed by two floors above ground and by a basement, it's rectangular and measures 45,40 by 33,89 metres with 8,50 metres high and the long sides oriented to northwest and southeast. It is made up of a reinforced concrete punctiform structure, organized according to a regular rectangular frame. The pillars along the longer side are 10 and the distance between each one is 4,70 m (the same indicated in the project). The pillars are square and not all with the same dimensions: in fact their sides measure 40 cm except for the pillars of the northern and southern face (not the ones on the corner) whose sides measure 30 cm. Along the shorter side the structure forms three spans: the central one is the widest (17,10 m) and it corresponds to the two main test-rooms, characterized by full height spaces, approximately square-shaped, separated by a central nucleus of services and recognizable outside by the big glazed walls; the lateral spans are 8,30 m and 7,00 m from north to south respectively. In the side "aisles", organized on two levels and divided themselves longitudinally in nine spans, at the ground floor are so arranged: to the north-west six test rooms (originally seven) and three observation rooms (originally two), to the south-east some laboratories, the toilets and, in the two building extremities, the staircases. On the first floor (picture 29)<sup>107</sup>, in correspondence of the laboratories, the offices take place while, on the opposite side and in correspondence of the test rooms, the technical spaces functional for the ventilation of the test rooms are disposed. On the basement the spaces are designated for the disposing of the exhaust gases resulting from the test

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<sup>105</sup> The dimensional and technical data result from the architectural survey, obtained through laser scanner, and by the numerous journals where the project has been published (see the note <sup>96</sup>).

<sup>106</sup> In the graphical investigation at page 228.

<sup>107</sup> In the graphical investigation at page 229.

rooms and they are connected to three chimneys placed along the northwest side, within 3 metres of the building (picture 30)<sup>108</sup>. The three chimneys, realized in three layers of freestanding sheet metal, serve the task of expelling the exhaust gases. In addition to meet the functional needs, they represent one of the main characterizing elements of the Institute, by contributing to lending it the character of an industrial building, with a clear reference to the Research Laboratory of the General Motors in Detroit (picture 31) designed by Eero Saarinen just few years before and visited by Henn himself in one of his study trips in America.

As concerns the used materials<sup>109</sup>, Henn doesn't choose prefabricated elements for the two laboratories, but he just adopts a prefabricated covering for the administrative building. He prefers rather traditional materials like the bricks for the claddings and the steel for the windows fixtures. In particular the external claddings (picture 32) are built in a double layer of bricks: both of them are 15 cm thick, the external is a dark brown clicker. An air gap 9 cm thick is left between them. In the testing rooms, on the northern side of the building, 5 cm of acoustic insulation is added in the external cladding, because of the loud during the experiments on the Engine<sup>110</sup>.

The use of brick for the external cladding shows not only a link to the local building tradition, but also an evidence of a desire of durability, since brick is a material with a great duration. It has also excellent thermoisolant performances in particular when, as in this case, the wall is realized with a double row (the one facing the outside is bigger), leaving a space between the two rows (an air gap), that alone is already a good insulation, and adding also a layer of insulating material. This means a great attention, from the designer, to the working conditions during the life of the building but also the will to realize the best building was possible with limited economical resources at disposition.

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<sup>108</sup> In the graphical investigation at page 235.

<sup>109</sup> The information concerning the material characteristics, quality and state of decay are taken by the direct investigations and tests (both destructive and not destructive) made on the building before its transformation by the Wissbau GmbH. Besides important have been the information taken from the several journals in which the project has been published at the time of realization.

<sup>110</sup> For a complete overview of the walls structure please refer to the table in the sheets analysis (technical investigation, pp. 245-246)

The concrete type used for the structure is comparable to the contemporary C25/30 or B300<sup>111</sup>. This result comes from the analysis on the borings through compression strength tests. Besides the rebound hammer test has determined that the medium value of the compressive strength is always bigger than the minimum value. Another test made for understanding the quality of concrete consists in the ultrasonic measurements from which it has resulted a good quality and homogeneity of concrete.<sup>112</sup>

The original glasses, as the historical pictures show in the several journals in which they are published, were glazed, light blue and they were double with a thickness of 8 and 10 mm; many of them have been substituted with transparent glasses, although before the last works of transformation (through which also the last survived original glasses have been removed) some original glasses dating back the realization were still present.

The technical device which Henn adopted for facing the function requirements and the resulting problems of pollution, concerns the ventilation system, which represents a cutting-edge system compared to the years in which it has been designed (picture 33). The external air is input in a first room on the first floor and filtered by two consecutive steps through some appropriate filters; a ventilation machine inputs then the air in the underlying test room. Equally innovative is the system of expulsion of the polluted air by the exhaust gases, which inevitably is produced during the tests made on the Engine in the test rooms. In this case the process occurs in the basement, through a series of spaces which are directly connected to the test room by a metal grid specifically predisposed for positioning the engine during the experimental phases. The exhaust gases descend and they are pushed, by a fan and passing through some noise-absorbing panels, towards the chimney from which the air is ejected. Thanks to these devices a certain healthy air is guaranteed also during the proofing tests while, thanks to the noise-absorbing panels adequately distributed along the walls and in the air vents, an acoustic level below the 55 db is ensured.<sup>113</sup> All the involved machines in

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<sup>111</sup> For a complete comprehension of the concrete characteristics, please refer to Hassler, Uta: Was der Architekt über Stahlbeton wissen sollte. Gfa Verlag, Zurich 2010.

<sup>112</sup> For a summary of the results, please refer to the table in the sheets analysis (technical investigation, p. 251).

<sup>113</sup> As already explained, one of the main problems that the Institute for Piston Engines had before the realization of the new building, in addition to the inadequate spaces, was the acoustic pollution resulting

the ventilation system are housed in dedicated rooms and the passage of the air happens through other specific rooms which don't house anything else.

### **3.3.3 The state of conservation**

Before the alteration of the Laboratory for Piston Engine, a deep study has been carried on, concerning the analysis of the quality of materials and their state of decay.<sup>114</sup> The building was in a very bad state of preservation: the concrete of the structure appeared seriously damaged, both on the pillars and beams surfaces many vertical and horizontal cracks were present, in addition to hollows and crumbles and to a deep carbonation in the outside pillars; the reinforcing steels were exposed in some sections and they were in advanced stages of corrosion; numerous infiltration of water were visible on the roof, whose inner surface presented moisture stains; on the basement structure, under the test rooms, many scaling and mineral deposits were present; the cladding bricks had started failing; also the windows frames appeared corroded with cracks in the seals.<sup>115</sup> At the same time, however, the quality of concrete and bricks resulted good, as it has emerged from the tests on the borings (seen in the previous paragraph).

The held data have been further analysed as part of this thesis, with the aim to understand the possible reasons for these important conditions of decay. A first examination has focused on the localisation of the different types of decay corresponding to the different external facades (divided according to their orientation) and to the interior, distinguishing the level of the different types of decay<sup>116</sup>. It has emerged that the most damaged elements of the building are the ones located on the external facades, the northern and the western, while the medium damaged are the ones located in the southern façade and inside the building (with regard to the moisture and to the incrustations on the basement structure).

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from the testing phases. A lot of complaints coming from the inhabitants of the tower blocks which were in the vicinity of the old University building, in Schleinitzstraße, complained the intolerable noise coming from the building also during the night hours or in the first morning. (NLA Wolfenbüttel, 7 A Nds Zg. 48/1980 Nr. 383)

<sup>114</sup> The study was made by the Wissbau GmbH (see the note <sup>109</sup>).

<sup>115</sup> For a summary of the types of decay and their level see the sheet analysis (technical investigation, pp. 248-250)

<sup>116</sup> see the table in the technical investigation, p. 250.

Gathering up all these information it has been possible making an hypothesis about the possible causes of decay, which have been divided in: planning (linked to decisions taken during the project), constructive (due to errors occurred during the realisation or in the implementation of the concrete mixture), material (due to the quality of materials), temporal (due to the natural decay of materials), maintaining (due to a lack of maintenance), functional (linked to the function housed in the building) and local (linked to the geographical position and to the environmental conditions)<sup>117</sup>. It has emerged that the main influence on the decay of the building was given by the local conditions, by a lack of maintenance and by the activities operated on the engines. In fact, as seen above, the most exposed facades are precisely the most damaged (the temperature in this Region of Germany in Winter reaches also Minus 20 degrees and the humidity level is always very high)<sup>118</sup>; during the building life any intervention of maintenance hasn't been carried out so that the natural decay of materials linked to the passing of time, has become very serious; the testing activities conducted in the building involved the use of oils and fuels, representing external factors which can damage the concrete<sup>119</sup>. On the other side, the good quality of materials and the awareness that maintenance could have avoided a so serious decay, suggest that Henn didn't made design choices with the aim to realize a very flexible but, at the same time, fragile building which could be easily destined to a demolition.

In January 2015 the works of transformation of the Double Institute for Piston and Turbo Engine (involving in particular the Laboratory for Piston Engine) began<sup>120</sup>. The planning team is composed of: the architectural firm ERNST<sup>2</sup> Architekten of Braunschweig<sup>121</sup>, the architectural firm RKW – Meyer GbR of Düsseldorf and the engineering firm Wetzels & von Seht of Hamburg. The works concern the conversion of

<sup>117</sup> see the table in the technical investigation, p. 253.

<sup>118</sup> The effect of the low temperature on concrete is damaging. About the concrete decay see: Dezzi Bardeschi, Marco (eds.): *La conservazione del calcestruzzo armato nell'architettura moderna e contemporanea. Monumenti a confronto. Quaderni di Ananke, 2.* Alinea, Città di Castello 2010. Di Biase, Carolina: *Il degrado del calcestruzzo nell'architettura del Novecento.* Maggioli Editore, Milano 2009. Hassler, Uta: *Was der Architekt über Stahlbeton wissen sollte.* Gfa Verlag, Zurich 2010.

<sup>119</sup> according to the list made by Fritz von Emperger already in 1908 in the journal "Beton und Eisen" about the causes which can weaken the concrete and compromise its duration, in: Dezzi Bardeschi, Marco (eds.) 2010, p.46.

<sup>120</sup> see the website relative to the new LENA building at: <https://www.tu-braunschweig.de/mib/lena/infrastructure/lena-neubau/index.html?jsessionid=TRIFORK178122732353> (accessed on the 10th March 2016).

<sup>121</sup> see the relative website concerning the project at: [http://www.ernst2-architekten.de/projekte.php?pi\\_id=754&kategorie=Forschung+und+Lehre&status=](http://www.ernst2-architekten.de/projekte.php?pi_id=754&kategorie=Forschung+und+Lehre&status=) (accessed on the 18th November 2017).

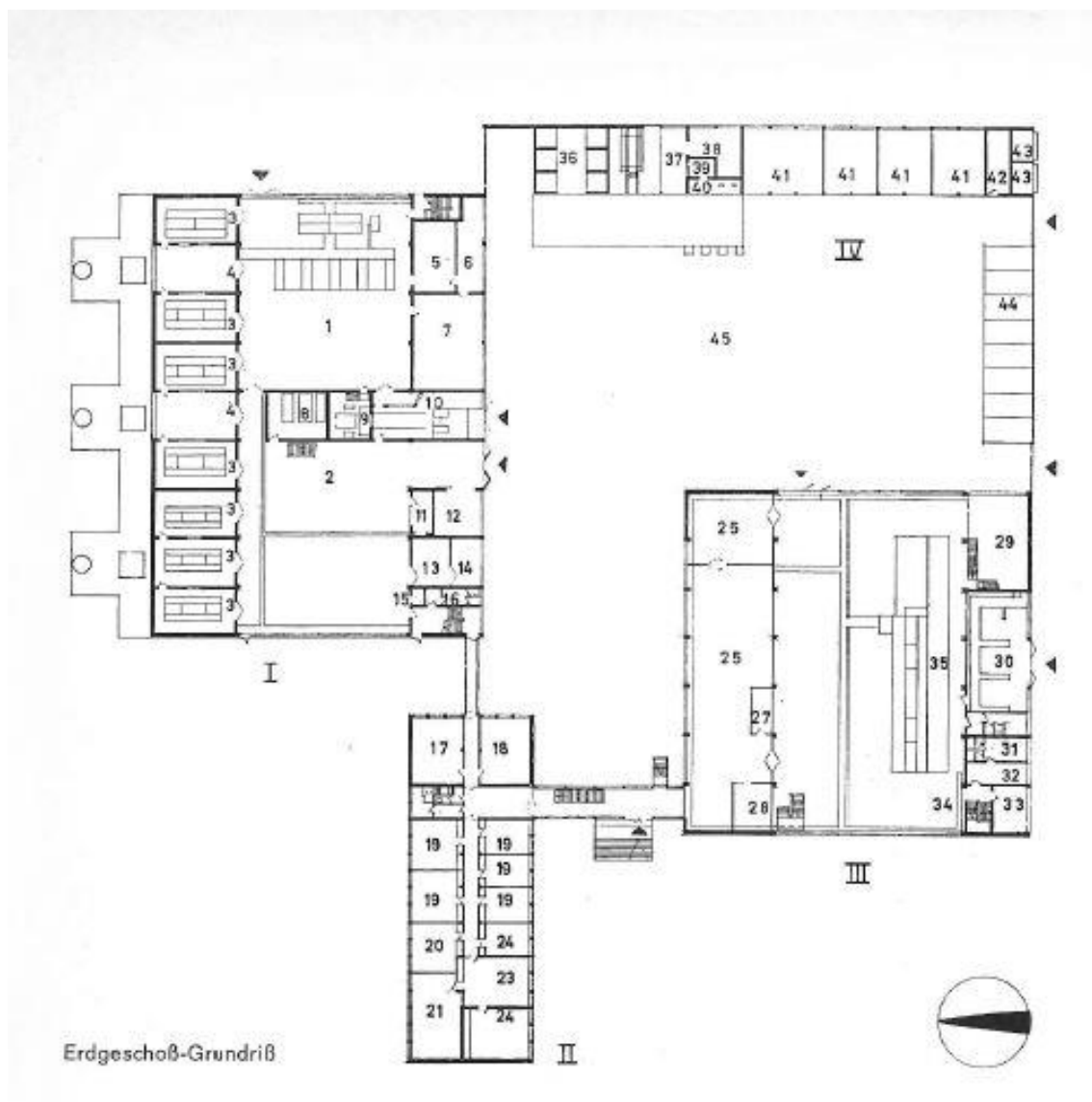
the Laboratory and the realization of a new Institute building (the Laboratory for Emerging Nanometrology). The main transformation of the building took place during the development of the present thesis and it has been possible to closely follow the changes.

First of all the garages building has been demolished, since in its place a new building, much bigger than the previous small one-floor construction, has been realized (picture 34). Then the works of demolition and transformation on the Piston Engine Laboratory took place: all the claddings and the windows have been removed; the chimneys and the north wing (housing the tests rooms, the ventilation rooms and the basement connected to the chimneys) have been demolished (picture 35). The next step has been the clean-up of the building from the polluted materials and the structure strengthening and refurbishment. Later the north wing has been completely rebuilt (except for the three chimneys, which have been substitutes with three trees); but the new northern façade is completely different from the original one: the concrete structure is not more on sight (its modular rhythm is no longer visible); all the new facades consist of prefabricated panels in facing bricks so that there is no more the continuity of the upper roof curb between the existing facades and the new ones. In the new northern façade, indeed, the new windows have been realized in completely different positions than in the original solution (picture 36). As concerns the new building, it is a rectangular three floors construction (higher than the two Laboratory buildings) and it occupies big part of the courtyard; with one of its short sides it is placed very next to the former Laboratory of Piston Engines, covering part of its southern façade; they are connected through a glazed passage. It is possible to appreciate the transformation of the whole complex by the planimetry (picture 37)<sup>122</sup>.

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<sup>122</sup> In the graphical investigation at page 226.





20: Planimetry of the Double Institute for Piston and Turbo Engines (in Zentralblatt für Industriebau, 16., 1970, 5, p. 204)



21: The main entrance of the Institute with the staircase ([www.Henn.com](http://www.Henn.com))

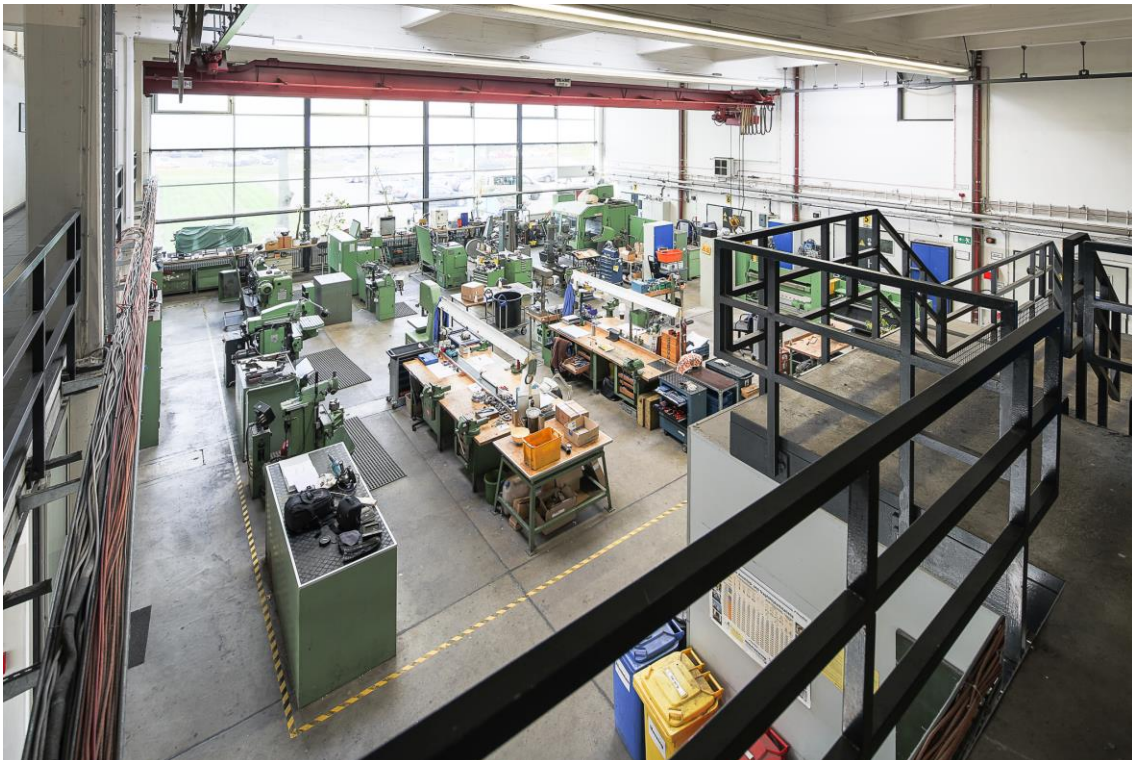


22: The Administrative building (Laura Nardi)





23: Institute for Turbo Engines, inner ([www.Henn.com](http://www.Henn.com))



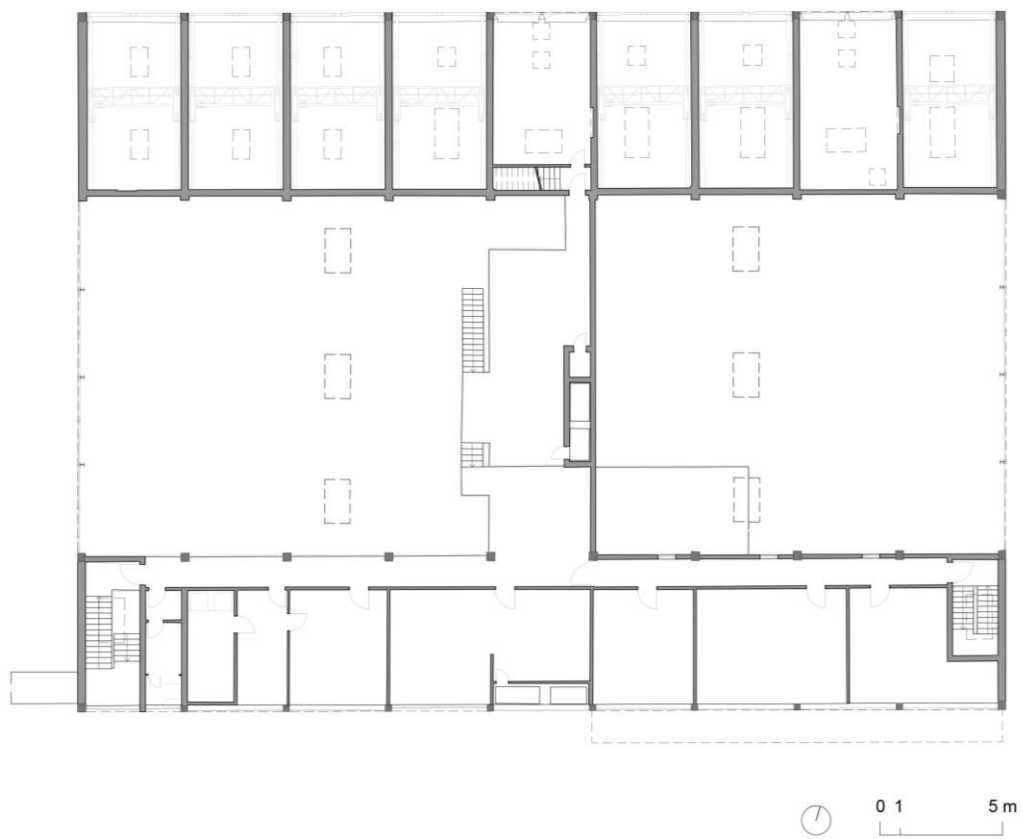
24: Institute for Piston Engines, inner (iTUBS)



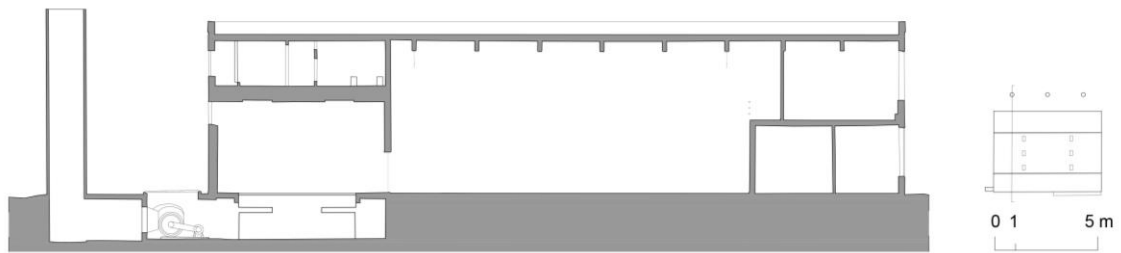




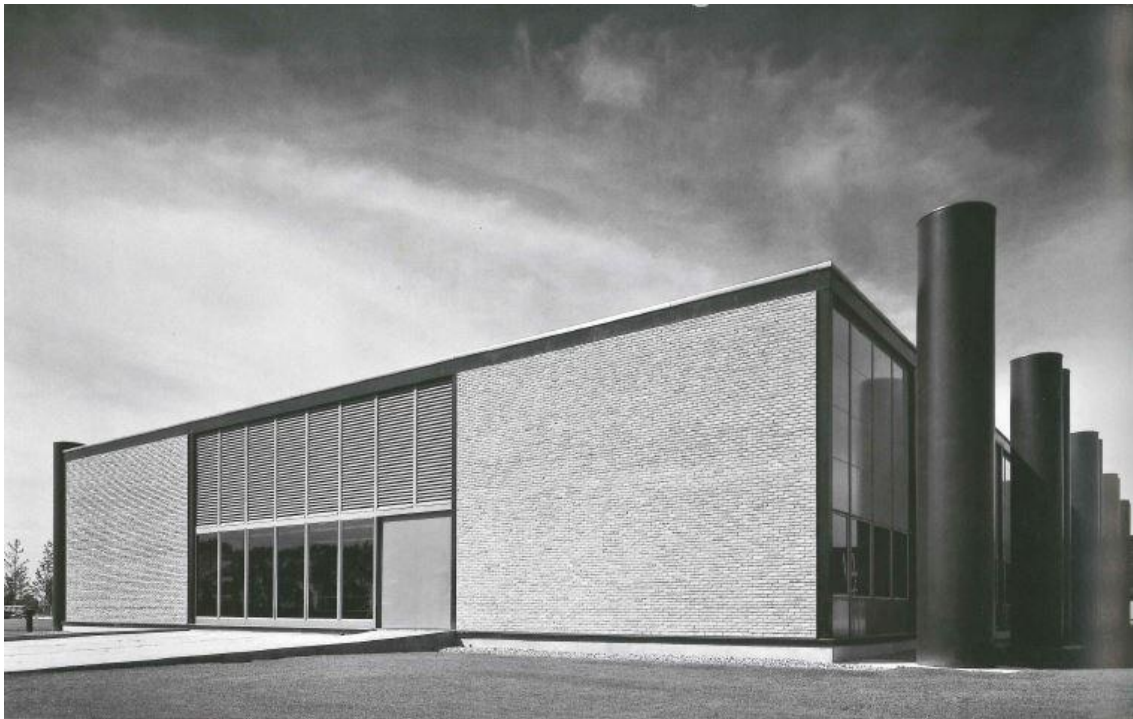
28: Ground floor (iTUBS and Laura Nardi)



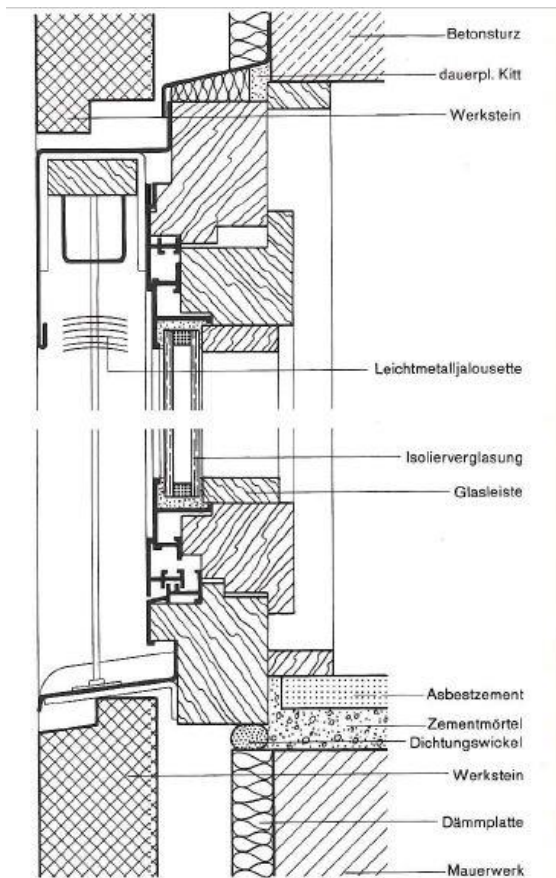
29: First floor (iTUBS and Laura Nardi)



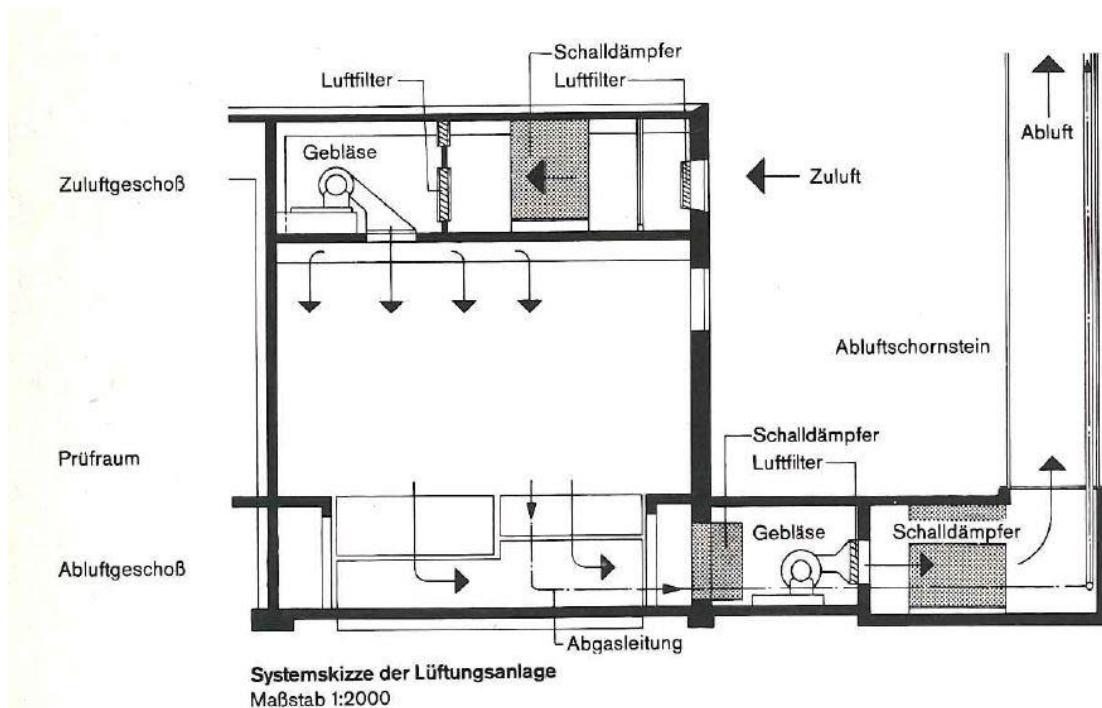
30: Section (iTUBS and Laura Nardi)



31: Research Laboratory of the General Motors in Detroit



32: Detail of the Laboratory cladding (in Zentralblatt für Industriebau, 16., 1970, 5, p. 204)



33: Ventilation system (in Zentralblatt für Industriebau, 16., 1970, 5, p. 204)





34: The complex courtyard (Laura Nardi, November 2017)



35: The north side laboratory demolition (Laura Nardi, February 2016)



36: The Laboratory north side (Laura Nardi, November 2017)



### 37: The complex transformation (Laura Nardi)





## 4. The Italian case study: the Anatomical-Surgical Academy in Perugia

### 4.1 The city planning characteristics

In the sheets the urbanistic planning is discussed:

in the bibliographical investigation, through the publications concerning the urban context and the insertion in the historical-urban-architectural-typological context (pp. 282-284)

in the archival investigation, in the dedicated section “urban plans” that is divided into graphics and analysis (planning state of art before the project, plan principles, restrictions and limitations (pp. 316-318)

The city planning of Perugia in the years 1930s - 1950s hasn't followed a Master Plan<sup>1</sup>. Even if there is an Urban Plan drawn up by Alfio Susini in 1931, it has never been adopted<sup>2</sup>. The Plan foresaw a series of demolitions of some parts of the historic heart that could irremediably alter the structure of the city<sup>3</sup>. The historical centre had been spared by the terrible war and, in the years after its end, there wasn't an emergency of homes and so the necessity of realizing new buildings<sup>4</sup>. In these years devoid of a Plan, the new interventions were regulated by the application of the Building Code, but it hasn't been possible avoiding isolated episodes in which people, acting without an urban conscience and legislation, jeopardised the historical heritage. In 1957 a Master Plan is drafted by Bruno Zevi, Mario Coppa, Giuseppe Grossi and Francesco Zannetti. It develops from the will of opposing to the way of proceeding of the previous years: it is “oriented to limit the interventions, introduces concepts of order, coordination and integration limited to restricted areas, in order to examine, in occasion of the Detailed Plans, a greater correspondence and a dimensioning of facilities and services in respect of the arriving observations”<sup>5</sup>. “Restrictive and precautionary criteria are

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<sup>1</sup> Muntoni, Alessandra: L'eredità: temi trasversali nell'architettura italiana del secondo dopoguerra, in: Belardi, Paolo (eds.): Giuseppe Nicolosi (1901-1981). Architettura Università Città. Conference Acts (19 October 2006). Libria, Melfi 2008, pp. 39-40.

<sup>2</sup> see Antinoro, Enrico: La cittadella universitaria e l'urbanistica della città, in: Belardi, Paolo (eds.) 2008, p. 143.

<sup>3</sup> from the General Report of the Plan made by Mario Coppa (1958), p.1.

<sup>4</sup> Different is the situation in Terni, whose historical centre had been destroyed because of the presence of important factories. See Avellino, Raffaele (eds.): Percorsi d'architettura in Umbria. Publisher Centro Italia, Foligno 2010, p. 556.

<sup>5</sup> from the General Report of the Plan made by Mario Coppa (1958), p. 1.

essential in this preliminary phase”<sup>6</sup> and they allow better to monitor the Plan application and to have a control on the exactness of the proposed solutions and to correct the gaps.

In the Master Plan there is a detailed description of the Umbria state of affairs before it. The Umbria Region is mainly agricultural and the industries on this territory are specialized in a sector, not by facilitating the development of further sectors linked to them. The same happens in Perugia: therefore it is necessary an extension of the industrial sector. As concerns the historical centre of Perugia city, a principle that informs the Plan is the necessity of sampling and properly analysing the historical buildings and their state, before any decision concerning them; this without precluding future actions, but as a necessary condition for any possible future choice. According to an analysis concerning the variation of the population, it emerged that the rural areas have seen a sharp increase (considering the 73 years between 1881 and 1954)<sup>7</sup> while the city of Perugia has seen a much smaller growth. In the Plan it is expected that the demand of housings in the following years could be very intense in the urban areas (much more than in the rural ones) as a consequence of the moving of people to the city; this means a necessity of increasing a lot the new constructions. In the previous years the realization of new residences in the city has determined, in the absence of a Plan, an intensive soil exploiting of areas outside the historical centre, but without paying attention to their homogeneity and to the consequent linked services. In these areas there is the need of giving a balance and creating associative cultural centres.

As concerns the risen up industries, they aren't well-connected with the residential areas, therefore it is necessary to join them with the new residential districts whose liveability can be improved by creating business, commercial and administrative centres that can balance the city with a better equipment. The city centre liveability instead, can be enhanced by moving outside some industries and the prison, and by clearing some historical-monumental buildings from the actual locations. With this aim, in the Variant of 1962, the new industrial sites are planned in the area down the Pievaiola Street.

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<sup>6</sup> *ivi*

<sup>7</sup> *ibidem*, p. 11.

In the context of the University buildings, during the years of the Master Plan development, some interventions concerning the realization of new Institutes are already underway: an enlargement is already considered and it is going to be realized both for the Institutes of Human Anatomy and Physiology, and for the Agricultural Faculty (consisting of lecture halls and of experimental stables with annexed free spaces)<sup>8</sup>; The University Great Hall, with the annexed Library (connected to the existing Rectorate and the University Church), the Second Students House as much as some interventions of restoration of some historical buildings are going to be completed according to the projects of Nicolosi himself, who forestalls the principles of the Zevi's Master Plan<sup>9</sup>: in fact Nicolosi has begun the realization of a new University Campus scattered in the historical city, already before it is considered by the urban planning. As regards the necessary interventions to envision, the Medicine, Agricultural and Veterinary Faculties ask for expansions and improvements; New Houses for students and accommodating buildings are required, in view of the increase of students; a new Library and a cultural centre, serving also as a Lecture Hall, are planned to be integrated with the Foreign University; besides a Museum of the city, urban and rural history is required. As concerns the hospital an enlargement is necessary: in fact, because of the central position of Perugia, between Rom and Florence and because of the extended municipality it serves, the requests for hospitalisation exceed the supply. The Anatomical-Surgical Academy is part of the area destined to the enlargement of the teaching hospital, which is expected since the 1958 Plan and confirmed also in the following variants (in 1962 and in 1964).

### **Plan principles**

In the Plan of 1958 the main principle concerned the complete conservation of the historical city and of the landscape heritage. In the following variants the importance of preserving the historical heritage is maintained, but without excluding the possibility of new additions to the urban fabric (after approval by Superintendence)<sup>10</sup>. As expected in the first Plan drawing up, the inhabitants in the city increased a lot, so much to double: to deal with this change, it is planned to realise the new residential areas in the suburbs

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<sup>8</sup> *ibidem*, p. 25.

<sup>9</sup> Antinoro, Enrico: La cittadella universitaria e l'urbanistica della città, in: Belardi, Paolo (eds.) 2008, p. 143. About the Great Hall see Verducci, Paolo; Zeppa, Maria Luisa: L'Aula Magna dell'Università. in: Belardi, Paolo (eds.) 2008, pp.165-179.

<sup>10</sup> see the General Report of the Plan Variant (1962)

districts, together with an improvement of their liveability and their connection with the town. As concerns the viability, the resolution of the problems in connection with the state of the roads is solved without any demolition of the urban fabric but through the realization of a ring road external to the city. For the realization of services and industries, the decisions are taken on the basis of the needs of people. The Plan considers also to reserve some green areas for every district, maintaining and improving the exististing ones and adding new ones, so that to preserve the green wedges which penetrate the centre.

The Building Code is completely revised and, on the basis of the new one, the rules for the areas, according to the different topographies and to the environmental conditions, are determined. In the zoning a distinction is made according to the population density. Some voluntary private associations are formed in order to realize apportionment plans for some areas. Even if they are private initiatives, they show an increased awareness in respect of the urban planning, so that they have been considered in the fulfilment of the Master Plan. In the Detailed Plans there was the intent to act in the historical areas, in order to restore crumbling buildings and to recover them for a different use removing the superstructures which distort some parts of buildings.

### **restrictions and limitations**

The area within the walls has been safeguarded and mostly of the buildings is bounded as historical heritage<sup>11</sup>. However some not yet preserved parts exist, and they have to be considered as a priority in the Implementation Plans in order to avoid any private action. To do that, a cataloguing of the historical buildings has been carried out: these are the areas “subjected to regeneration” for which a direct survey has to be made in order to detect the construction substance of each building, the housing substance, the owners and the state of art of the building from the static and hygienic point of views. Moreover, all the areas to the limits of the walls are bounded because of the landscape as panoramic areas<sup>12</sup>. There are also areas referred to as “with bond of relocation”: in this case the relocation of the building or of the complex of buildings has to occur within six years.

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<sup>11</sup> see the General Report of the Plan made by Mario Coppa (1958), p.13.

<sup>12</sup> *ibidem*, p.12.



As concerns the area where the Academy has risen up, it belongs to the area bordering on the historical centre and, therefore, considered panoramic. In fact, even if not directly in contact with the protected heritage of the city centre, the relationship, both with the rural and with the historic areas, is noteworthy. Nicolosi in his project considers not only the panoramic bond, but also the visual relation with the city. For the area there are no other limitations, being a place on the edge between the historical city and the rural area outside the city devoid of any monument, and being already earmarked for the enlargement of the didactic hospital.

## 4.2 The designer: Giuseppe Nicolosi

In the sheets the figure of Giuseppe Nicolosi is discussed:

in the bibliographical investigation, through the publications concerning the designer his projects and made by himself (pp. 266-278).

Giuseppe Nicolosi<sup>13</sup> was born in Rom in 1901 where he studied in the Classical High School and then at the Engineering School where he graduated in 1924. He started the academic career until 1937, collaborating with Gustavo Giovannoni and successively with Arnaldo Foschini in the Architectural Composition chair. Both of them were the guides of his professional career: from Giovannoni he learned the attitude in the careful analysis of a place as a result of a multiplicity of different contributions; from Foschini he acquired the exceptional accuracy and the abstraction of the shapes. In 1924 he also began the professional practice by joining the studio of Alberto Calza Bini who introduced him in the Social Housing Institute (IACP), being the director. Nicolosi had the occasion to be involved in the theme concerning the popular residence, which represented the main subject of his project research.

Nicolosi's architecture represents an individual experience in the context of the definition and strengthening of the new Modern Movement. In fact, he pursues independent experiences on the fringes of the interpretative categories used for the definition the 20th-century architecture<sup>14</sup>. The Nicolosi interpretation of modernity deviates from the self-referential approach of his contemporaries; he counterpoises the idea of a collective architecture, devoid of those licences and formalisms that enhanced the buildings of other modernist architects<sup>15</sup>: his architecture is based on a clear typological definition, a coherence of the structures and the attention to detail. At the same time, together with Pier Luigi Nervi, Riccardo Morandi and Federico Gorio (who belongs to the Rome School of Engineering like him), Nicolosi is part of the engineers who lay the basis of how defining a new contemporary architecture language after the Second World War: they suggest to start from the function, employing the power of the

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<sup>13</sup> the information about his biography are taken by Gorio, Federico (eds.): Giuseppe Nicolosi: figura, opere e contesto. Monographic issue of "Rassegna di Architettura e Urbanistica", XXXVI, 106/107/108 2002. Belardi, Paolo (eds.): Giuseppe Nicolosi (1901-1981). Architettura Università Città. Conference Acts (19 October 2006). Libria, Melfi 2008.

<sup>14</sup> Purini, Franco: un valore che si chiama bellezza, in: Belardi, Paolo (eds.) 2008, p. 17.

<sup>15</sup> *ibidem*, pp. 18-19.

structure for giving life to the architecture<sup>16</sup>. But, unlike his contemporary architects, in the Nicolosi fabrics the value of the cladding surpasses that one of the structure<sup>17</sup>. In fact, the main recurring and characterizing themes in his buildings are: the relationship between the supporting structure and carried elements (which are separated); the meaning of the cladding, with a dual role (constructive and aesthetic); the space, defined by severe and rhythmical shapes<sup>18</sup>.

Another fundamental theme is the link between architecture and city. In the years after the Second War, in particular, it is necessary to identify the significance of the city to be rebuilt<sup>19</sup>. In this respect, the Italian architecture looks to the past, than to the future as it happens in Germany. Through the new constructive techniques and a rational establishment, Nicolosi wants to use the architecture for representing and making readable the nature of the cities<sup>20</sup>. In this respect he can be compared with the experiences of Giancarlo De Carlo in Urbino and Mario Ridolfi in Terni<sup>21</sup>, three different ways of proceeding even if in the same years<sup>22</sup> (Nicolosi has numerous exchanges of views at distance with the architect Mario Ridolfi, with whom he shares his stylish expressiveness and the great care put on the details of each project). De Carlo translates the language of the Medieval city through the modern architecture: by filling up the empty spaces in the historical centre, he continues the development of the city with contemporary evidences. Ridolfi operates in a city destroyed by the war and he chooses not to recover the ancient city, but to transform it by the use of the contemporary architecture and introducing the periphery in the town. Nicolosi in Perugia acts humbly: like Saverio Muratori and Ernesto Nathan Rogers, Nicolosi doesn't create isolated architectures, but architectures in close contact with the city<sup>23</sup>.

Nicolosi deals mainly with the residential architecture and, in particular, taking a particular interest in the popular housing. Already between 1926 and 1928, at the beginning of his professional career, he designed a complex of five residential buildings

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<sup>16</sup> Muntoni, Alessandra: L'eredità: temi trasversali nell'architettura italiana del secondo dopoguerra, in: Belardi, Paolo (eds.) 2008, p. 32-33.

<sup>17</sup> *ibidem*, p. 35.

<sup>18</sup> Purini, Franco 2008, p. 19.

<sup>19</sup> Muntoni, Alessandra 2008, p. 36.

<sup>20</sup> Purini, Franco 2008, p. 20.

<sup>21</sup> see the comparison also in the bibliographical investigation at pages 283-284.

<sup>22</sup> see Muntoni, Alessandra 2008, pp. 37-39.

<sup>23</sup> Purini, Franco 2008, p. 21.

in the Lot 51 of the Garbatella district in Rome and in 1930 for the Lot 27. This area has been designed in the 1920s-1930s years following the example of the English garden-cities: the courtyards and the gardens among the buildings realize a continuous, fluid space<sup>24</sup>. With these projects, in 1933 Nicolosi was chosen for taking part to the V International Triennial Exhibition of the Decorative and Industrial Arts and of Modern Architecture in Monza. In the following years he designed popular houses also in many other cities in Italy. After the Second World War, he collaborated with the INA Casa Institute: the challenge in this field concerned the realization of good, even if humble, architectures with a little budget and solely intended to meet very simple necessities. Nicolosi wins this challenge since he doesn't merely realizes functional buildings, but also full of suggestions.

In the same years he started the first project experiences for residential buildings, he dealt also with the towns planning. In 1927 he became part of the Roman City Planners Group (GUR) and he participated to many Competitions for Urban Plannings: Brescia in 1927, Assisi, Santa Maria degli Angeli, Padova and Rome in 1928, Terni and Arezzo in 1929, Pisa, Marina di Pisa, Cagliari in 1930 and Perugia in 1932, winning in Arezzo and Cagliari. He collaborated also in other Urban Plannings and he was engaged for the Rebuilding Plan of many cities. In 1936, together with Giorgio Calza Bini and Gino Cancellotti, he draws up the Foundation plan of Guidonia city: influenced by the De Chirico metaphysical spaces, they designed the Municipality square and hall. Here, for the first time, the Nicolosi bricks texture of the external walls appears. All these urbanistic experiences have important repercussions in Nicolosi architecture after the Second War, in particular because they represent the occasions for preserving the historical heritage of the Italian cities.

In his first interventions, he is strongly linked to tradition, in particular because he tended to accent the materiality and the mass of the buildings. Already in 1928 he leaves the classical style and his architecture becomes functional, being impressed by the Italian Exhibition of Rational Architecture, where he presented the project of "A modern House". In particular he comes into contact with the new construction

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<sup>24</sup> see Nicolosi, Stefania: Biografia di Giuseppe Nicolosi, in: Belardi, Paolo (eds.) 2008, p. 246; Aspetti di architetture d'oggi in Italia. Arch. Giuseppe Nicolosi, Roma. Veduta particolare di una casa popolare alla Garbatella, in *Domus*, IV, 1931, 41, p. 47; Argenti, Maria; Nicolosi, Giuseppe: Garbatella, Edifici del lotto 51, in: Remmidi, Gaia et.al: Il moderno attraverso Roma. Guida a 200 architetture e alle loro opere d'arte. Palombi, Rome 2000.

techniques (the use of the concrete frame structure together with bricks claddings, the use of glazed surfaces) which allowed to separate the structure from the cladding.

In 1931 he stood for a less radical conception of the Rationalist Architecture, joining the RAMI (the Young Italian Architects Grouping, where some architects of the “Gruppo 7” merged) and together with other architects among whom Luigi Moretti and Mario Paniconi, signed their sample position paper “Per la nuova architettura italiana”, published in “Il Tevere” on 2 May 1931. Nicolosi maintained always a moderate personal position with regard to the Rationalist Architecture, favouring the specificity of an intervention at any standardisation and uniformity<sup>25</sup>.

In the 1950s he distanced himself from the Rationalism: in particular because he called into question that oversimplification of a complex reality<sup>26</sup>. Exactly in this period he approached to the sacred architecture<sup>27</sup>. The essence of his Churches can be read on the facades whose definitive aspect is reached after many different hypotheses. The Nicolosi churches are characterized by the austerity and simplicity and through them he tries to capture both the community core and the essence of the religious architecture<sup>28</sup>. “He tries to keep together form and content, past, present and a possible future, truth and construction, simplicity and profoundness”<sup>29</sup> basing his churches on a strong thought, steeped in the history.

Amongst the churches he designed in the aftermath of the Second War, the most significative are:

S. Giuseppe Calasanzio in Frascati realized between 1946 and 1956 (picture 1) exemplifying of the following Nicolosi’s approach in the historical centres and whose project has been determined through a progressive simplification of the decorative apparatus;

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<sup>25</sup> please refer to Nicolosi, Giuseppe: La standardizzazione nell’abitazione collettiva. Organizzazione industriale del cantiere edile, in: Acts of XIII International Congress of architects (Rome, 22-28 September 1935). Rome, 1936, p. 5.

<sup>26</sup> Nicolosi, Giuseppe : Nuove tecniche e materiali. Loro influenza sull’architettura, report presented to the VI International Union of Architects Conference. London, Juli 1961, p.8.

<sup>27</sup> please refer to Argenti, Maria: L’architettura religiosa, in: Belardi, Paolo (eds.) 2008, pp. 87-108.

<sup>28</sup> *ibidem*, p. 89.

<sup>29</sup> *ibidem*, p. 95.

the Sacred Heart Church in Spoleto which dates back in 1953 (picture 2) with a single aisle structure and with a characteristic façade whose final composition has been reached after a series of different hypothesis;

in Terni he realized the Immaculate Conception in 1953 (picture 3)<sup>30</sup> and S. Gabriele in 1958 (picture 4): in both of them the concrete structure appears on sight, in contrast with the traditional stone cladding and differently from the previous examples. The concrete structure is punctiform so that it allows to the external walls to be free and to be crossed by a continuous vertical opening (expedient later used for the Great Hall);

between 1960 and 1967 the S. Policarpo Church in Rome (picture 5) with a hexagonal structure. It resulted from reasoning based on a precise geometry study, but it strictly derives from the place: the centralized structure, in fact, allows the highest realization possible so that to be as much as possible visible. The walls are characterized by a particular texture of bricks with both an acoustic and aesthetic effect.

In 1948 Nicolosi started collaboration with the dean of the Perugia University Giuseppe Ermini, who asked him to deal with the realization of the University Campus. The Nicolosi intervention is structural, deeply-rooted in the historical centre, aimed to revive it and decisive for the urban organisation of the city after the War: in fact, both Ermini and Nicolosi didn't had in mind an isolated new Campus, but they imagined the University as part of the existing urban fabric and scattered in the city<sup>31</sup>. Therefore, in the context of the Master Urban Plan Variant of 1962, which foresaw the expansion of the city through the new urban suburbs and, so, the delocalisation of many functions present in the historical centre, the Nicolosi work wants to produce a reverse effect<sup>32</sup>. And even if he acted for single episodes, the global planning was coherent.

Not only he realized new buildings, but he also restored and adapted five ancient palaces for housing there the Faculty of Philosophy and Letters (1959) and the School of Education (1965). Besides, as regards the new realizations, he didn't occupied empty or green spaces within the city, but he recovered urban areas with pre-existing functions<sup>33</sup>. He began his interventions in 1950 with the Great Hall building<sup>34</sup>, ended in

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<sup>30</sup> In the technical investigation at page 358.

<sup>31</sup> see Nicolosi, Enza: Ermini e Nicolosi: un sodalizio storico, in: Belardi, Paolo (eds.) 2008, p. 136.

<sup>32</sup> Antinoro, Enrico: La cittadella universitaria e l'urbanistica della città, in: Belardi, Paolo (eds.) 2008, p. 144.

<sup>33</sup> *ibidem*, p. 145.

1957, the Institute of Agricultural and Agronomy and the second Students House. In 1953 he realized the Anatomy and Physiology Institutes. Then in 1959 the Students House<sup>35</sup> and in 1965 the Faculty of Economics and Commerce and a Library have been realized. The University pool dates back to 1967. The Neurological Clinics, the Institute of Mathematics Physics and Natural Sciences<sup>36</sup> are dated 1968. In 1969 he deals with the restoration and arrangement of the University Portal<sup>37</sup> (which was realized by Valentino Martelli in 1591 and abandoned in 1800s next to the Academy of Fine Arts); some buildings of the Faculty of Medicine and Surgery and a building for classrooms in common. Finally, in 1971, the Anatomical-Surgical Academy is realized, the last building belonging to the Nicolosi's scattered University Campus.

Significative University buildings<sup>38</sup> realized by Nicolosi that can be compared with the case study are:

- the University Great Hall and Library, designed between 1950 and 1957<sup>39</sup> and placed next to the Rector's Office. The main significative characteristic is given by the designed bricks texture (picture 6)<sup>40</sup> of the wall weaving that is both a cladding and an acoustic element, while the concrete structure remains on sight.
- the Faculty of Math, Physical and Natural Sciences realized in 1964 (picture 7)<sup>41</sup>. Its main characteristic is given by its urban role in serving as a connection between two parts of the city separated by a difference in height. This building also has its own bricks texture for the walls.
- the Students House, realized in 1959 (picture 8)<sup>42</sup> characterized by its relationship with the surrounding in which it is placed and by the bricks cladding with concrete structure.

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<sup>34</sup> see in the bibliographical investigation at page 269.

<sup>35</sup> see in the bibliographical investigation at page 271.

<sup>36</sup> see in the bibliographical investigation at page 270.

<sup>37</sup> see Belardi, Paolo: *La sistemazione del Portale dell'Università. Una lezione di partecipazione guidata*, in: Belardi, Paolo (eds.) 2008, pp. 151-164.

<sup>38</sup> As specified for the German case study, "significative buildings" is related to the case study and here it means the buildings realized in the same period of the case study and belonging to the same type, presenting important characteristic or innovations that could have influenced it.

<sup>39</sup> see in the bibliographical investigation at page 269.

<sup>40</sup> in the technical investigation at page 358.

<sup>41</sup> in the bibliographical investigation at page 268.

<sup>42</sup> in the bibliographical investigation at page 271.

- the chemistry Department, Nature and Biological Institutes (picture 9)<sup>43</sup>, realized between 1961 and 1968<sup>44</sup>, that is in direct contact with pre-existing elements and designed around them: a Roman mosaic and a collapsed church. The contemporary structures are recognizable differentiating themselves from the ancient ones, but being extremely respectful at the same time so that they are enhanced.

From the significative Nicolosi buildings here briefly illustrated, and considering the examples seen before, it emerges that both for the University architectures realized in Perugia, and for any intervention he made within the historical centres, Nicolosi always acted in such a way to be measured: neither mimetic, nor distant, but respecting the existing place and the local constructive tradition<sup>45</sup>. His University buildings, in particular, play multiple roles: they link up the historical hill urban settlements and they contribute to give a contemporary definition in the context of an historical city like Perugia. These results have been possible thanks to the will, shared both by Nicolosi and Ermini, of realizing an urban campus not isolated, but immersed within the historical urban fabric. Each building project is anchored to the context, respectful of the pre-existing elements and not limited to meet a necessity or a function: it goes beyond becoming a building for a larger community, usable, permeable, accessible and that adds value to the place and the landscape in which it is placed. As concerns the materials, all the University buildings in Perugia are realized with a concrete structure (which often is underlined letting it on sight) and by a brick texture, each time different, that is specifically designed by Nicolosi himself for each case. These details can be considered the most significative for Nicolosi architecture, representing his label. These materials are used at the same time for denouncing the contemporaneity of his interventions (since they derive from the northern European architecture), together with the architecture composition and a distinct use of the modern construction techniques; and to recall the ancient architectures as an analogy with the not ended facades of the medieval churches<sup>46</sup>. In the use of materials it is visible the influence of the Scandinavian Empirism: in particular the Swede Erik Gunnar Asplund influences Nicolosi in the way to deal with the relationships between new and existing buildings (they share the ability of making recognisable the new interventions although they

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<sup>43</sup> in the bibliographical investigation at page 270.

<sup>44</sup> see in the bibliographical investigation at page 271.

<sup>45</sup> Antinoro, Enrico 2008, p. 145.

<sup>46</sup> Storelli, Franco: "Lo stile", in Belardi, Paolo (eds.) 2008, p.78.



harmonize with the pre-existing buildings) and through all his architecture that is organic and rationalist at the same time.

The most emblematic building among the listed ones that is related to the Anatomical-Surgical Academy is the Great Hall<sup>47</sup>. Both of them communicate an image of monumentality since they are representative buildings. Even if they harmonised with the context, they also stand out in the city skyline, acting as point of references in the landscape (picture 10<sup>48</sup> and 11). Their shape directly derives from the Nicolosi holy architectures and their inner space (in particular in the Great Hall) can be confused with a church nave (picture 12). In fact, the church symbolizes the community architecture per excellence, having all the characteristics belonging to the meeting places and, for this reason, it can be associated with the University buildings<sup>49</sup>. In this sense, the Nicolosi Great Hall represents his personal interpretation of the Franciscan fabric, an issue addressed by many other contemporary designers: like Giovanni Michelucci, whose Franciscan fabrics are represented by the Church of the Virgin in Pistoia (picture 13) realized in 1947 and by the laic Savings and Loan in Florence (picture 14) realized between 1953 and 1957.

A sentence which summarized the Nicolosi thought is: "Architecture and city planning represent the study of the human life environment; environment which requires its creator to support and elicit the process of improving the lives: environment where the civilization shows its level through a value which is called beauty"<sup>50</sup>

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<sup>47</sup> see in the bibliographical investigation at page 265 and in the technical investigation at page 358.

<sup>48</sup> In the graphical investigation at page 345.

<sup>49</sup> Muntoni, Alessandra 2008, p. 35.

<sup>50</sup> from Purini, Franco: un valore che si chiama bellezza, in: Belardi, Paolo (eds.) 2008, p. 21 (translation made by Laura Nardi). You can find it also in the bibliographical investigation at page 276.



picture 1: St. Giuseppe Calasanzio Church in Frascati



picture 2: the Sacred Heart Church in Spoleto



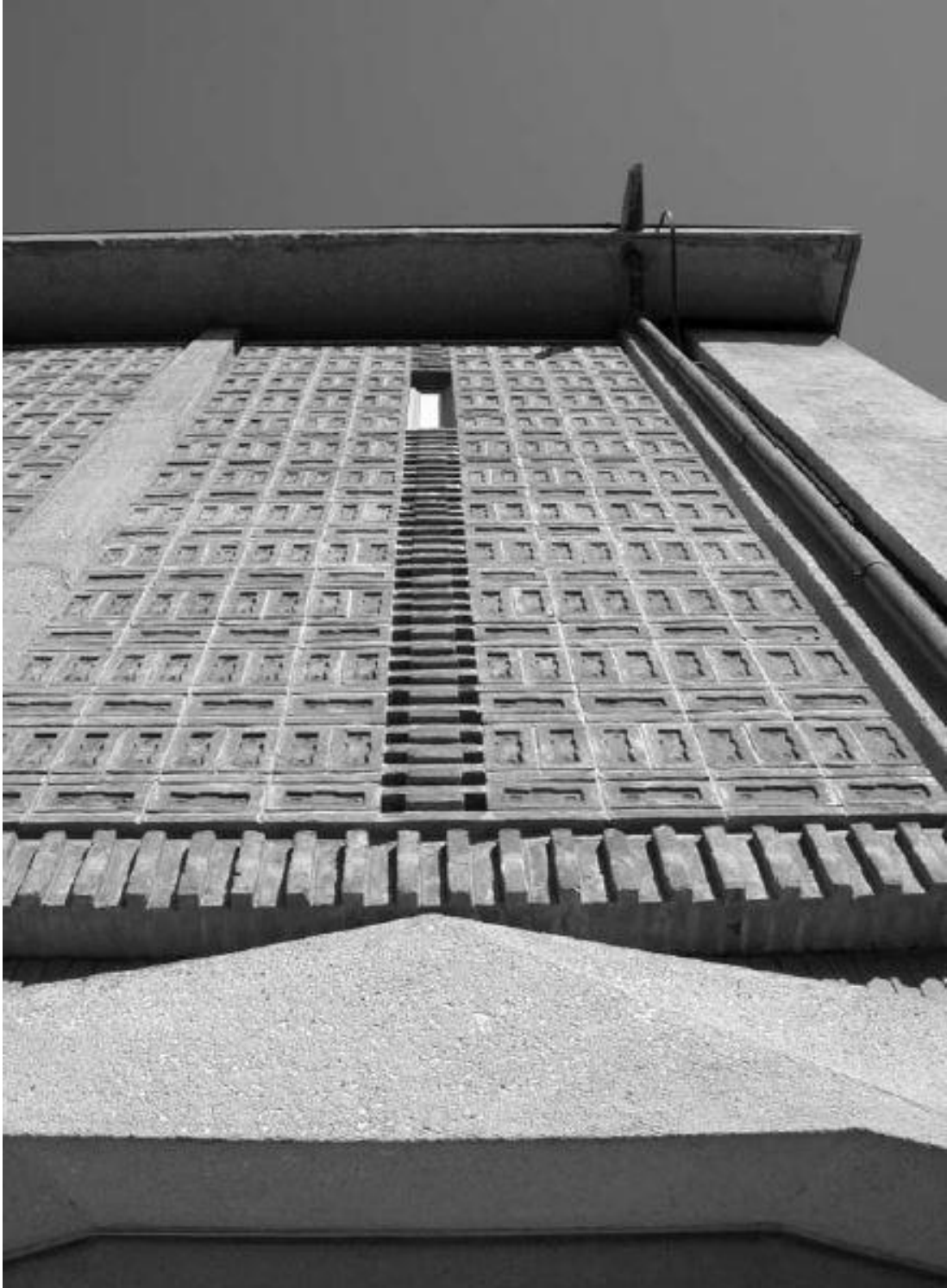
picture 3: the Immacolate Conception Church in Terni



picture 4: st. Gabriele Church in Terni



picture 5: st. Policarpo Church in Rome



picture 6: breaks texture in the University Great Hall in Perugia



picture 7: Faculty of Math, Physical and Natural Sciences in Perugia





picture 8: Students house in Perugia



picture 9: Chemistry Department, Nature and Biological Institutes in Perugia





picture 10: the Anatomical-Surgical Academy fit into the landscape



picture 11: the Great Hall fit into the landscape. Bottom left the economics and political science Faculty by Nicolosi



picture 12: the Great Hall inside





picture 13: the Church of the Virgin in Pistoia by Giovanni Michelucci



picture 14: the Savings and Loan in Florence by Giovanni Michelucci

### 4.3 The building

In the sheets the aspects concerning the building are discussed:

- in the bibliographical investigation, through the publications concerning the Institute both in books and in journals (pp. 277-278);
- in the archival investigation, through the original drawings analysis (pp. 287-315);
- in the graphical investigation, through the analysis on the drawings resulting from the architectural survey (pp. 321-342) and through the photographs (pp. 343-345)
- in the technical investigation, through the analysis of the materials (characteristics and quality) and the analysis of their decay and relative cause (pp. 348-353)

The Anatomical - Surgical Academy has been designed from 1971 to 1974 and realized from 1974 to 1975, even if the official conclusion occurs in 1981<sup>51</sup>. It has been operative till 2013, when the inner functions have been transferred to the new Faculty of Medicine and Surgery on the outskirts of Perugia (in the San Sisto area). The Academy is located at the edge of the historical centre, in Enrico Dal Pozzo Street, in a then new area which should house an extension of the Faculty of Medicine (which was not too far from there, in the Montelucre district). Nicolosi himself was contributing in this realization: he designed the Institutes of Anatomy and Physiology (1953), the Institute of Pathological Anatomy (1960), the Neurological Clinics (1968), the Department of Internal Medicine (1969) and, next to the Academy, in Del Giochetto Street, he realized the University classrooms (1969) and the enlargement of the Biological Institutes (1970). These two buildings were being realized during the development of the Academy project. The Academy building is the last one realized within the Faculty extension and it isn't in direct contact both with the rest of the Faculty constructions and

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<sup>51</sup> The publications regarding the Anatomical-Surgical Academy are: *Annuario dell'Università degli Studi di Perugia a.a. 1963/'64*, Perugia 1963. *Annuario dell'Università degli Studi di Perugia a.a. 1964/'65*, Perugia 1964. *Annuario dell'Università degli Studi di Perugia a.a. 1967/'68*, Perugia 1967. Dozza, Giancarlo: *Università di Perugia. Sette secoli di modernità 1308-1976*. Perugia 1991. Belardi, Paolo: *La necessità della libertà espressiva. Architetture umbre di Giuseppe Nicolosi*, in: Belardi, Paolo: *Il rilievo insolito, irrilevante, irrilevato*. Perugia 2002, pp. 215-225. Menchetelli Valeria: *L'Accademia Anatomico-Chirurgica*, in: Belardi, Paolo (eds.): *Giuseppe Nicolosi (1901-1981) – Architettura Università Città*, Conference proceedings (Perugia, 19 October 2006). Libria, Perugia 2008, pp.229-242. In the bibliographical investigation at page 277.

with the historical centre. Therefore it appears isolated, raised up a hill and overlooking the landscape towards the city and to the countryside.

Nicolosi elaborates three different variations of the project, made known thanks to the numerous drawings left by him. As happened with other buildings (Churches and Universities) the main studied, sketched and changed elements are the facades. In fact through them the significance of a building, in particular with reference to representative buildings, is depicted. The first hypothesis (picture 15)<sup>52</sup> dates from 1971: the external siding chosen by Nicolosi was the stone, for all the facades; together with a solemn portal in travertine, the image of the building was very severe and austere: the entry was upstream, at the Hall level, through a double flight of stairs in order to overcome the difference given by the levelling of the site; there wasn't a view in the Hall. The second version (picture 16)<sup>53</sup> belongs to 1973: the main entry was downstream, at the Library level, while upstream there was a direct entry to the Hall occurring through a gangway, instead of the flight of stairs; there is no a levelling of the terrain; a gallery, with a view on the Hall, appears, but it is not open but glazed. The final version (picture 17)<sup>54</sup> was made between 1973 and 1974 and there are very important variations: the external siding consists no more of stones but of bricks; the main entrance is the one downstream, but other secondary entrances are put upstream and on the west side; important is the super elevation of the roof in order to build the characterizing false ceiling of the Hall; the gallery is open on the Hall. The final project has been followed, for the structural part, by the Engineer Franco Checcarelli.

The Anatomical-Surgical Academy has many characteristics in common with the other buildings realized in the urbanistic intervention for the University of Perugia and, in particular, with the Great Hall. It is the last Nicolosi's project for the Perugia Campus and one of the last of his professional career. Therefore it holds a synthesis of his researches and it represents a sort of legacy of his work.

#### **4.3.1 The function**

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<sup>52</sup> In the archival investigation at page 287.

<sup>53</sup> In the archival investigation at page 294.

<sup>54</sup> In the graphical investigation at page 344.

The building housed several university functions: the Central Library, the Presidency, a Great Hall, technical rooms, a reading room, and the location of the Anatomical Surgical Academy. This last one is a moral institution: since 1923 it doesn't deal anymore with the study of the human anatomy, but it organizes seminars, scientific debates in the biomedical area, houses graduation and doctoral dissertations and academics keynote lectures. Therefore it has a representative role, rather than didactic on a par with the role played by the University Great Hall.

The different functions are arranged as follows. The ground floor houses the Library (with a mezzanine), the Presidency and the technical rooms (which are placed also in the basement). The Hall serving as Foyer is reachable from both the main entrances, to the front and back of the buildings. The first and second floors house the Great Hall: in particular its space is double height and occupies both the two floors; on the top floor there is the gallery, looking into the Great Hall, and the projection booth.

The main function is represented by the Great Hall, which occupies most of the building and whose shape influences all the other spaces shape surrounding it (as it is better described in the next paragraph). Therefore the Anatomical-Surgical Academy can be considered a functional building, that is to say<sup>55</sup>, a building with a strong dependence on its function. Since the building is actually<sup>56</sup> abandoned, it becomes important to understand what are the significative elements that deserve to be preserved in the event of a future reuse.

#### **4.3.2 The architecture**

The Anatomical-Surgical Academy is placed as a background of the complex of buildings that represent the expansion of the Faculty of Medicine and Surgery. The Academy is put at the end of the new axis drawn by the street halfway the two realizing buildings (at the time of the development of the project) (picture 18)<sup>57</sup>. This choice contributes to give a monumentality character to the building, since not only it is the point of arrival of the axis, but it is also placed perpendicular to it, in a sloping terrain

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<sup>55</sup> please refer to the definition done in the introduction, p. 13.

<sup>56</sup> November 2017.

<sup>57</sup> In the graphical investigation at page 321.

and in a dominant position on the surrounding landscape. The difficulty of the project has been the location of the main entrances, because of the difference in height (the project was originally expected for a flat terrain).<sup>58</sup>

The building measures 46 by 15 metres with 21.40 metres high from the basement to the roof level. From the planimetries (both relative to the project and deriving from the architectural survey<sup>59</sup>) it is soon evident a great regularity of the composition: the building and its structure are symmetrical in relation to the longitudinal axis, and this regularity characterizes both the inner and the outside (including the main entrances). The building consists of three floors and of a basement (which doesn't occupy the whole surface of the building). The fixed elements, in addition to the outer perimeter, that cross the building from the ground floor to the second floor are: the circular staircase on the northern side, and the oval space, which surrounds the foyers at the ground and first floors, and defines the projection booth on the second floor. Their centre is placed on the central axis and they constitute elementary volumes floating in the empty space defined by the external walls (this reading is well perceptible in the second floor plan, picture 19<sup>60</sup>). Together with the curved shape of the Great Hall, these volumes take the anatomical form of a sort of a "lying man". This shape is maybe determined by the suggestion of the original function of the *Anatomical Surgical Academy* institution (which has been the studying of the human anatomy until 1923)<sup>61</sup>; at the same time, the curved Great Hall, with the elevated gallery from which to observe it, evokes the anatomical theatre of the ancient *Studium Generale*, where the study of the human anatomy, and the participation of students observing from above, occurred.

The building looks like a ship from outside; Nicolosi has it defined as an "Ark of the medicine studying, overlooking the scientific landscape"<sup>62</sup>. The west side represents

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<sup>58</sup> as described in the report of the project, written by Nicolosi. For this reason he has imagined different solutions changing the main entrances any time (see the archival investigation, pages 287-315 for the different solutions and the "description of the building" at page 278 in the bibliographical investigation).

<sup>59</sup> The basis for this work is the architectural survey elaborated by Riccardo Gori in the as part of his graduate thesis in Civil Engineering: Gori, Riccardo: *Rilievo architettonico dell'Accademia Anatomico-Chirurgica di Giuseppe Nicolosi*. Dissertation (A.y 2005/2006. Supervisor: prof. Paolo Belardi; assistant supervisor: Valeria Menchetelli). University of Perugia.

<sup>60</sup> In the graphical investigation at page 327.

<sup>61</sup> see Menchetelli, Valeria 2008, p. 230.

<sup>62</sup> *ivi*.

the bow, the east side the poop. In this sense, the concept of ship, together with the ones of cars and airplanes, also symbolizes and depicts the idea of a modern architecture (as indicated by Le Corbusier). The symmetry along the longitudinal axis is maintained also in elevation and it is in this way visible in the east and west fronts (the short sides). Also the main entrances are symmetrical and they are recognizable by the presence of two lateral walls: these are evocative of the entrances examples present in the ancient architecture and contribute to the idea of monumentality of the building. Nevertheless, the southern front is predominant if compared to the northern, in particular because of the absence, in the northern, of the staircase conducting to the main entrance (which contribute to the sense of monumentality) and because of the presence of the fire-escape (which wasn't drawn in the project drawings). In both these fronts the windows are organized according to three orders in elevation: smaller in the first lower level (in which the windows are double, one above another) and they are 17; mid-sized in the second level (where there are just 4 sparse windows); larger and continue in the third level. In the northern long side, at the fire-escape, the window of the second level has become a door, interrupting the rhythm of the windows composition (picture 20)<sup>63</sup>. This change of the rhythm isn't present in the project drawings (picture 21)<sup>64</sup>: this means that the fire-escape has been realized after the realization of the building, involving the façade adjustment. As regards the short sides, the inclination of the gables, along the longitudinal sides, is parallel: for this reason the surface of the eastern façade is bigger and it points upwards (picture 22)<sup>65</sup>, while the surface of the western side is smaller and it is "pressed" by the roof gable (picture 23)<sup>66</sup>. The eastern side is the highest one since it goes from the basement to the top of the roof; it is characterized by an external, double staircase reaching the level of the ground floor. Between the staircases, the entrance to the basement is placed. The roof is cut off by a window on the top that voids the wall mass of the façade, in which there is a prevalence of the filled on the empty. The western side is the lowest one and it corresponds to the circular staircase side. It is constituted by a solid wall mass, except for a cut made by a vertical window traversing the staircase.

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<sup>63</sup> In the graphical investigation at page 333.

<sup>64</sup> In the archival investigation at page 301.

<sup>65</sup> In the graphical investigation at page 334.

<sup>66</sup> In the graphical investigation at page 332.



The characteristic composition of the fronts is exactly given by the bricks texture, the designer's label. Nicolosi draw the texture in detail on a front drawing, since the composition of the bricks layers is specific for the building<sup>67</sup> (picture 24<sup>68</sup> and 25). The different disposition of bricks in the horizontal rows produces a shading effect, especially opposite the windows. The facades, if observed from a distance, appear massive, opaque; but they result jagged at a closer look: in this sense they have a double level of perception. This perception is given by the bricks themselves because, thanks to their texture, give a strong perception of an alternation between empty and filled. The windows have not an intense rhythm, but they acquire a bigger depth because of their asymmetrical splay. The short sides differ once again and their openings seem to highlight the symmetry longitudinal axis.

The Nicolosi aim of giving expression, from outside, to the inner Great Hall<sup>69</sup> is reached by the raising and the inclination of the roof realized in order to create the necessary space in the crawlspaces for the realization of the evocative suspended ceiling: it consists of a backwards double-keel hull and it characterizes the main space of the building (picture 26)<sup>70</sup>.

The building is made up of a concrete punctiform structure and of two masonry walls, which correspond with the two circular volumes of the staircase and of the foyer<sup>71</sup>. The distance between the pillars, along the external walls, is 2,4 m and the maximum span (15 m) corresponds to the width of the building. The pillars are 40 by 50 cm and the foundations are deep. The floor's height is 4.9 metres on the ground floor and between 7.4 and 11.45 metres in the Great Hall. As results by the investigation on materials (in particular from the compression strength tests made on the borings) the concrete is ascribable to the C25/30 or B/300. All the walls are 64 cm wide, and made of an internal brick wall, an air gap and an external brick cladding. The windows frames are

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<sup>67</sup> as it has been explained in the paragraph relative to the designer Giuseppe Nicolosi, at p. 90.

<sup>68</sup> In the archival investigation at page 302.

<sup>69</sup> This concept emerges from the Relation linked to the project written by Nicolosi himself.

<sup>70</sup> In the graphical investigation at page 343.

<sup>71</sup> The information concerning the building structure and materials derive from the investigation made by the Engineering Massimo Mariani whose report is: Mariani, Massimo: Verification of seismic vulnerability of the Anatomical-Surgical Academy in Perugia. General Report. University of Perugia, Perugia 2013 and by the investigation made by the Engineering Carlo Brondi, whose report is: Brondi, Carlo, Verification of seismic vulnerability of the Anatomical-Surgical Academy in Perugia. General Report, University of Perugia, Perugia 2016.

in steel, the glass is single but almost all of them are insulated. The pavements are in linoleum in the library, in marble in the foyers and in carpet in the Great Hall.

As concerns the most characteristic spaces, it is evident that the Great Hall represents the main intended use of all the building and every choice made by the designer is depending on this space. In fact it takes up the greater part of the building (this is visible both in planimetry and in section). In particular, in the longitudinal section it is evident the predominance of its volume in relation to the other spaces (picture 27)<sup>72</sup>. Also in the cross-section the characteristic curve surfaces emerge, confirming their importance (picture 28)<sup>73</sup>.

The spaces of the Anatomical-Surgical Academy are characterising and representative because of the relevance and recognisability of the adopted shapes and volumes. The main spaces (the Great Hall with its open gallery and false ceiling, the library with its loft, the elliptic lobby and the helicoidal staircase) are conceived by Nicolosi so that the observer and the user can have a total perception of their volumetric articulation. These spaces, however, don't show themselves from outside, from where the building is perceived as a solid volume, comparable to the ones of the Nicolosi churches (picture 29)<sup>74</sup>; the only clue of the inner presence of curved lines is given by the "apse" obtained by the main circular staircase volume (picture 30)<sup>75</sup>: the building acts like a "theca" containing anatomical volumes.

The main characteristic of the circular walls is that they are structural: this means that not only they create a characteristic space, but they are also integral part of the building and they cannot be changed in the future. And so this means that the designer intention at the basis of the project depends directly on the function; the function becomes structure and the structure itself becomes aesthetic.

#### **4.3.3 The state of conservation**

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<sup>72</sup> In the graphical investigation at page 336.

<sup>73</sup> In the graphical investigation at page 337.

<sup>74</sup> In the graphical investigation at page 345.

<sup>75</sup> *ivi*.

From the tests on materials conducted in the building after his abandonment by the “UniLab sperimentazione srl”<sup>76</sup> it has emerged a good quality of them and a good state of preservation<sup>77</sup>. In particular, from the tests on borings, it results that the medium carbonation depth is normal inside and a little bit thicker outside, that is to say that the concrete decay corresponds to the normal temporal decay. As concerns the ferroskan test<sup>78</sup> on the reinforcing bars, it results a medium reinforcement of the concrete, but corresponding to the approach of the time; from the Brinell hardness tests it resulted a good resistance. For testing the quality of masonry, the video-endoscopic investigation<sup>79</sup> and the Karsten test<sup>80</sup> have been carried on: it emerged a very good quality and a good resistance of masonry. For evaluating the building seismic performance, a seismic global investigation has been conducted: since the realization took place in the 1970s, the building meets also the requirements of seismic vulnerability just for the 34% and, for further uses, it is in needs of some intervention in order to improve its seismic performance. Nevertheless, the building is not damaged except for the false ceiling of the Great Hall (picture 31).

As concerns the types of decay involving the building, it results that in general there is very light severity of decay, in particular looking at pillars and beams (vertical and horizontal cracks) and to the bricks cracks; this has been observed both inside and outside. But a medium decay has been found in the pillars, regarding the fragile mechanism of the central pillars: the reasons can be found in the not sufficient seismic performance and they can be attributed to the local and planning causes. High damaged, and requiring an intervention, results the false ceiling because of its cave-in. Once again, this decay can be associated to the not inadequate seismic performance, but also to a lack of maintenance. For concluding, it is possible to affirm that the state of decay is mostly due to the local condition (in particular because of the seismicity of the area) and to the insufficient performances adopted at that time.

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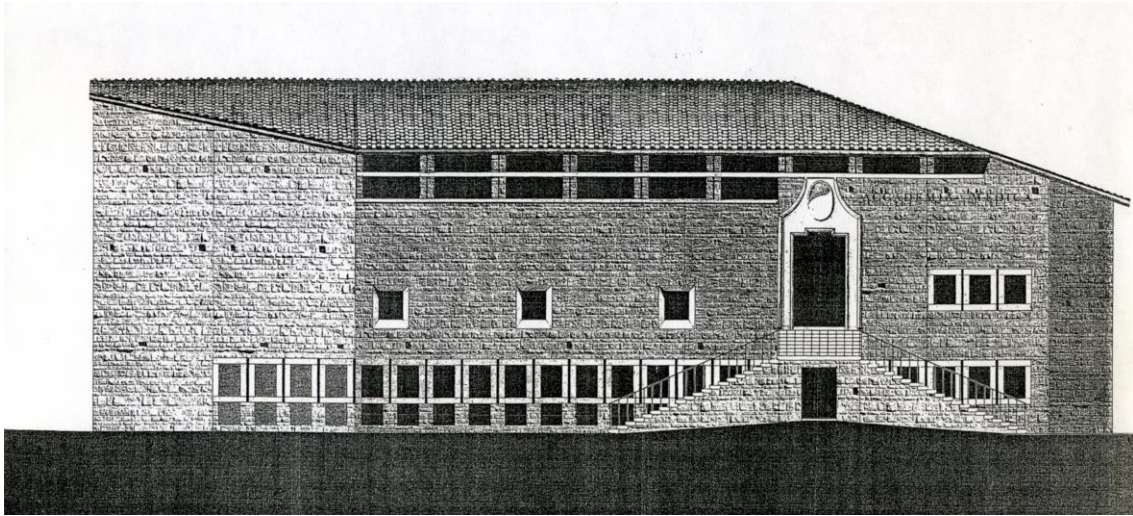
<sup>76</sup> The investigation on the state of preservation.

<sup>77</sup> For the results of the tests on materials please refer to the technical investigation, pp. 350-355.

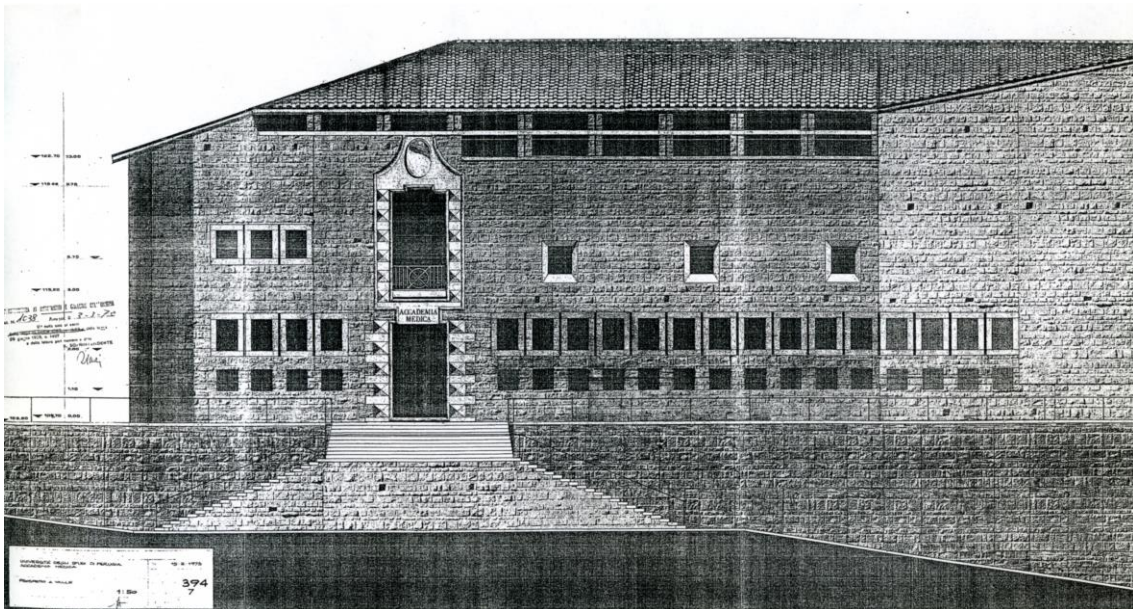
<sup>78</sup> made by Massimo Mariani for the UniLab in 2013.

<sup>79</sup> see the previous note.

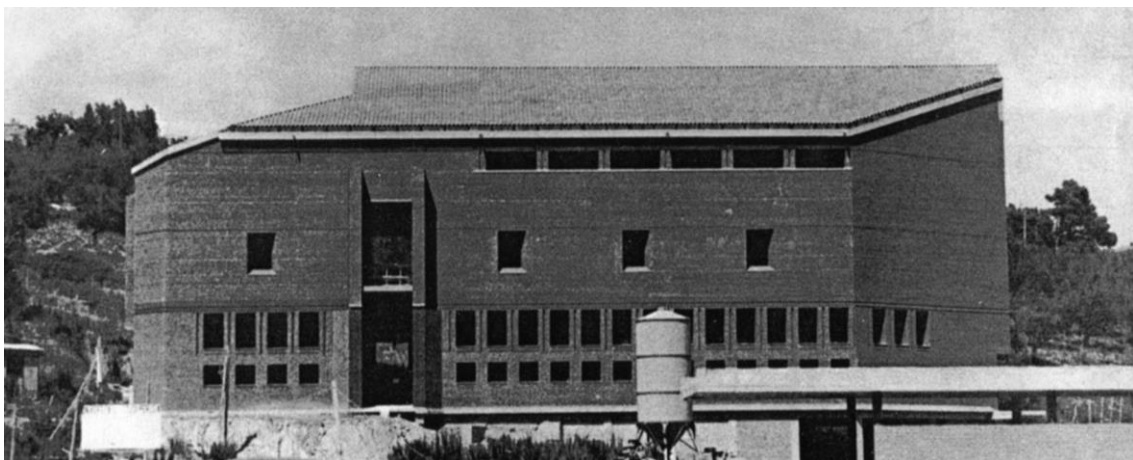
<sup>80</sup> made by Carlo Brondi for the UniLab in 2016.



picture 15: the Anatomical-Surgical Academy, first hypothesis (1971)



picture 16: the Anatomical-Surgical Academy, second hypothesis (1973)

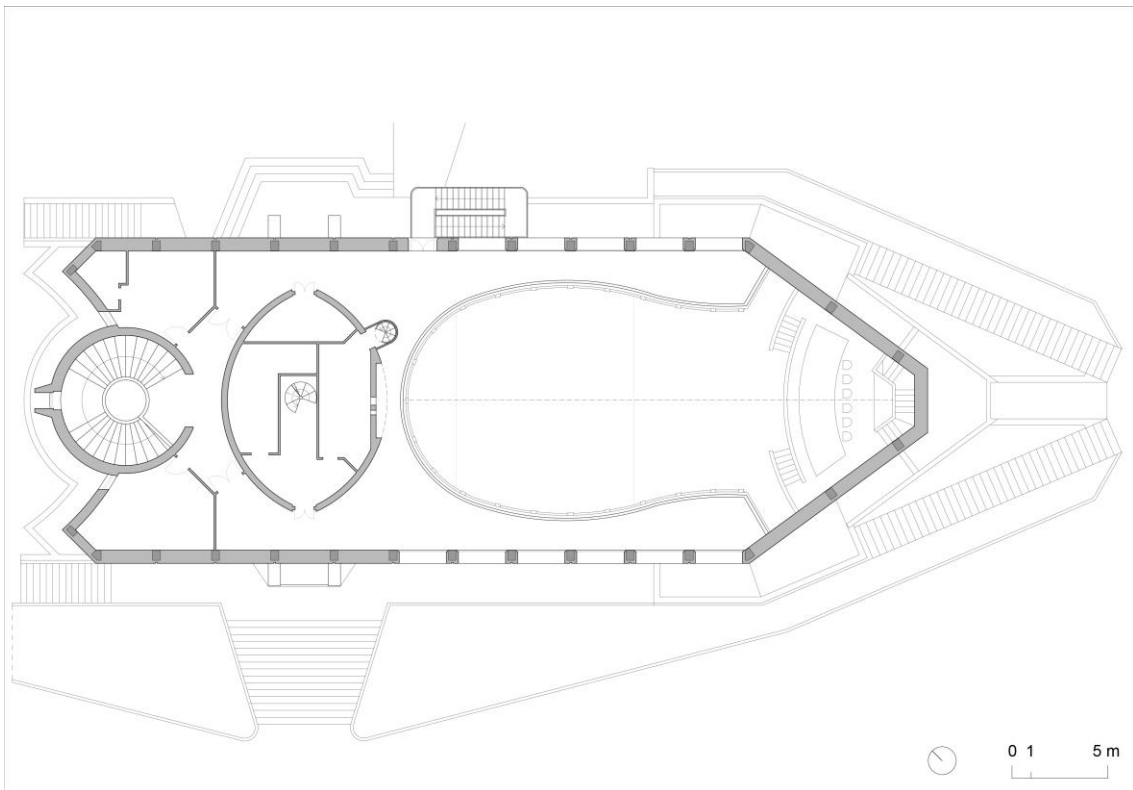


picture 17: the Anatomical-Surgical Academy, final hypothesis (during the construction)

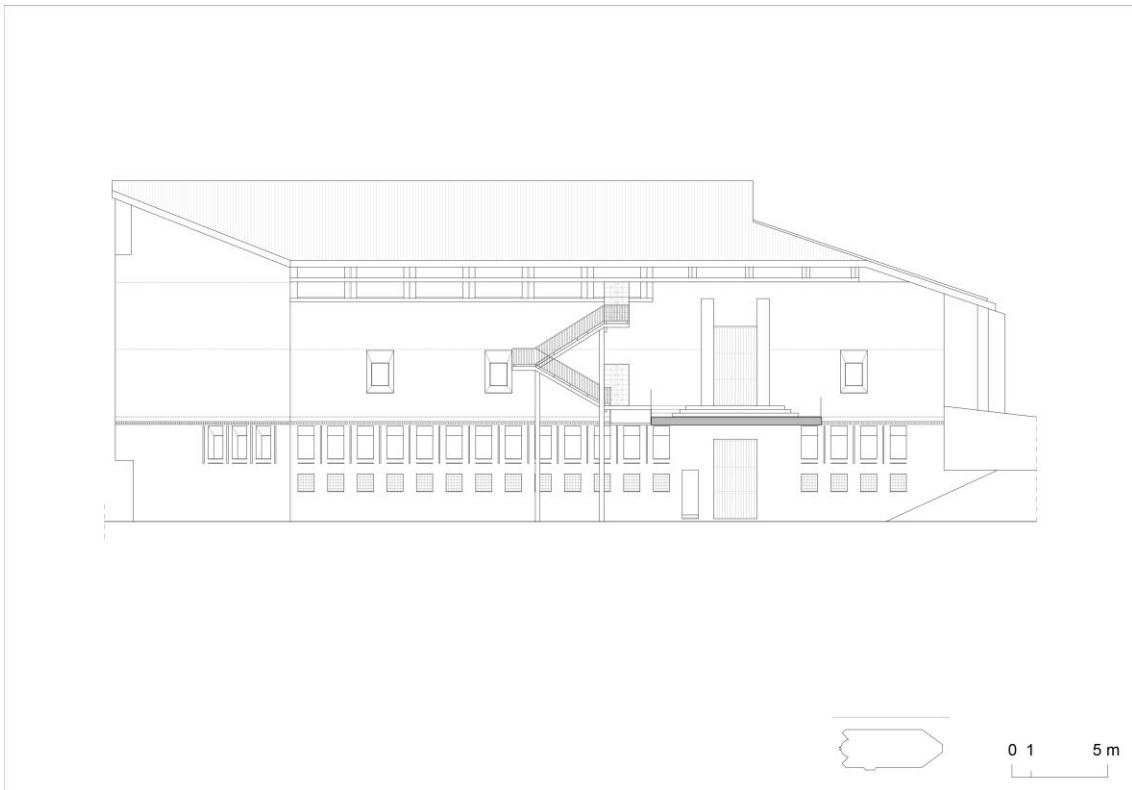




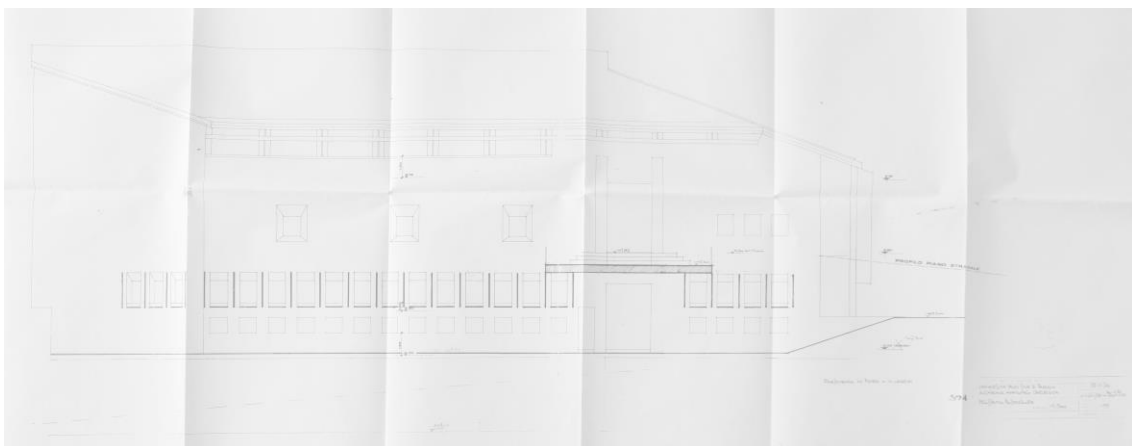
picture 18: the Anatomical-Surgical Academy, layout (Laura Nardi)



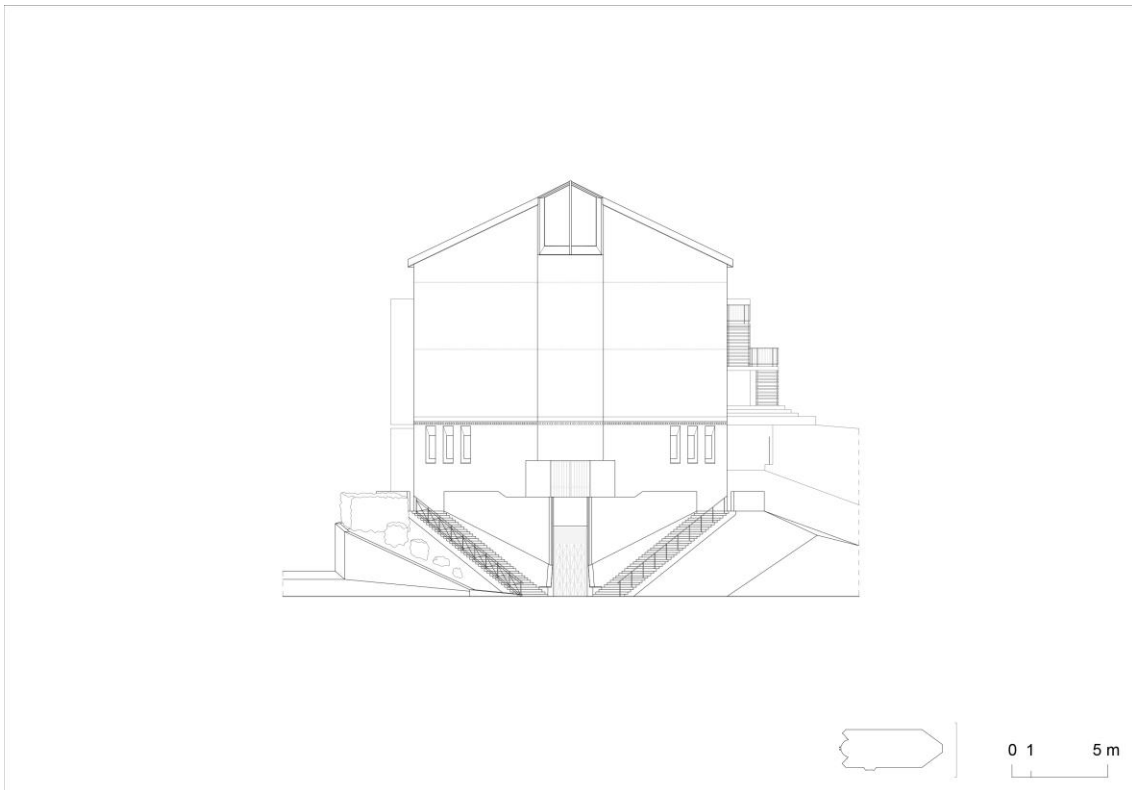
picture 19: the Anatomical-Surgical Academy, second floor (Laura Nardi)



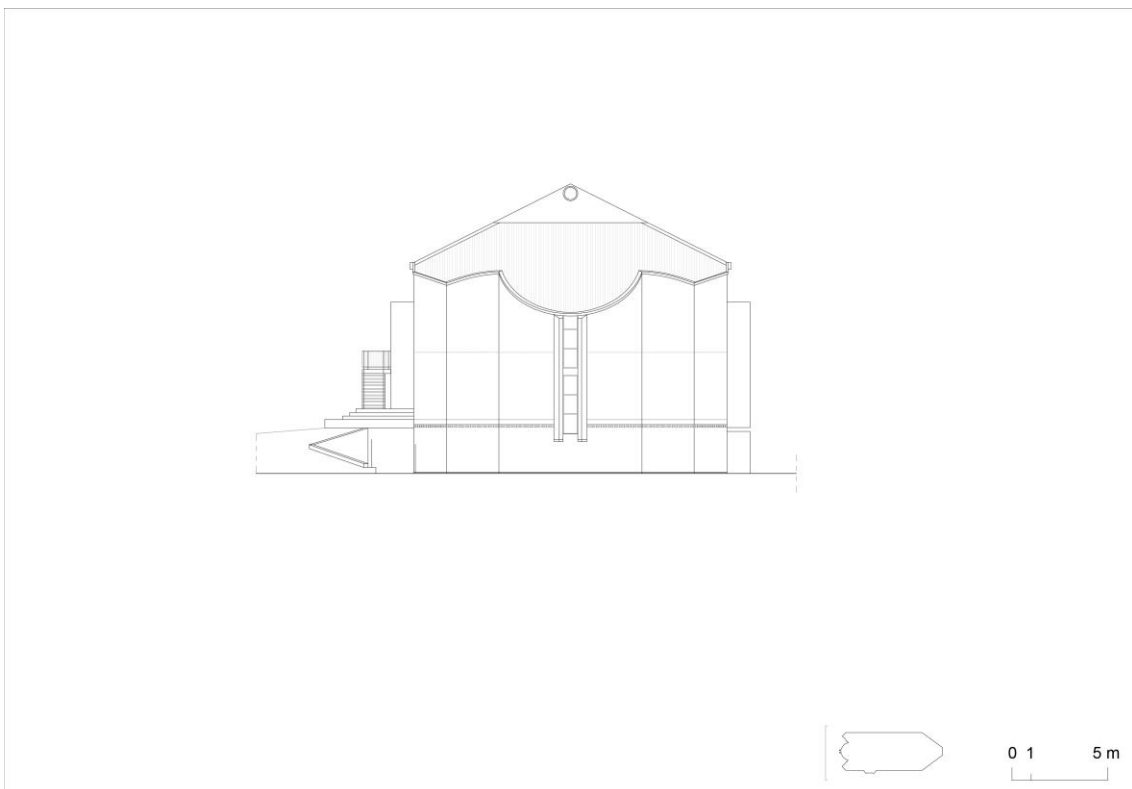
picture 20: the Anatomical-Surgical Academy, north façade (Laura Nardi)



picture 21: the Anatomical-Surgical Academy, north façade (project)



picture 22: the Anatomical-Surgical Academy, east façade (Laura Nardi)



picture 23: the Anatomical-Surgical Academy, west façade (Laura Nardi)

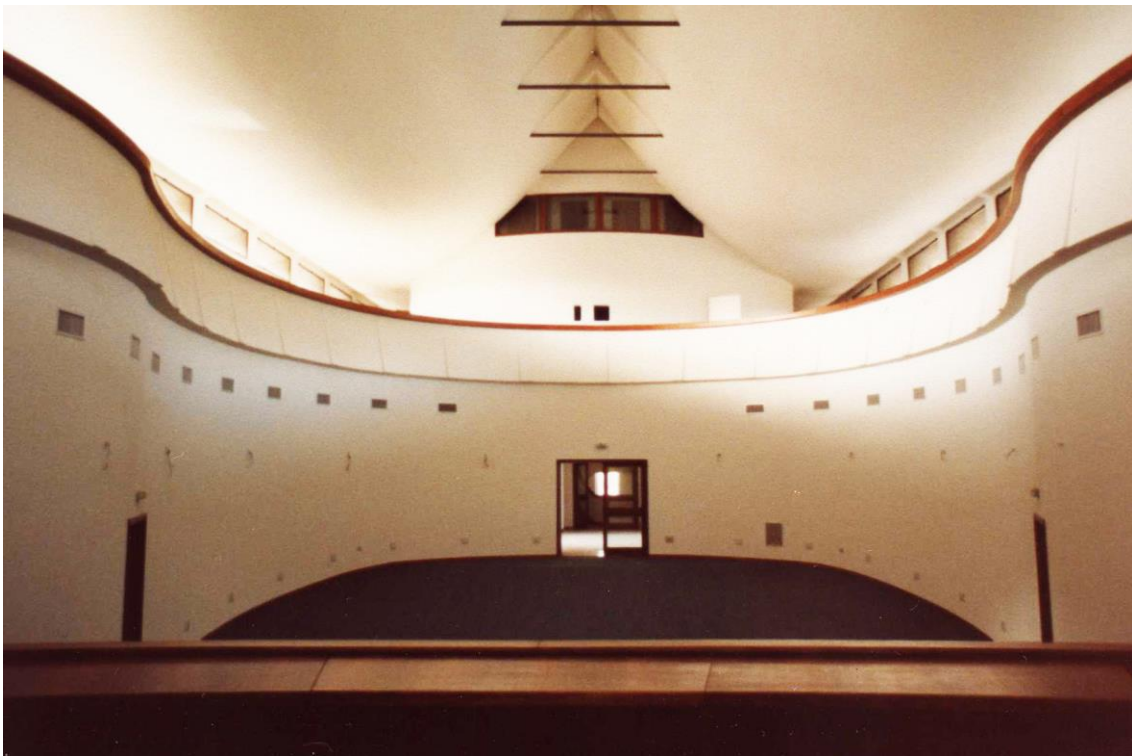


picture 24: the bricks texture project

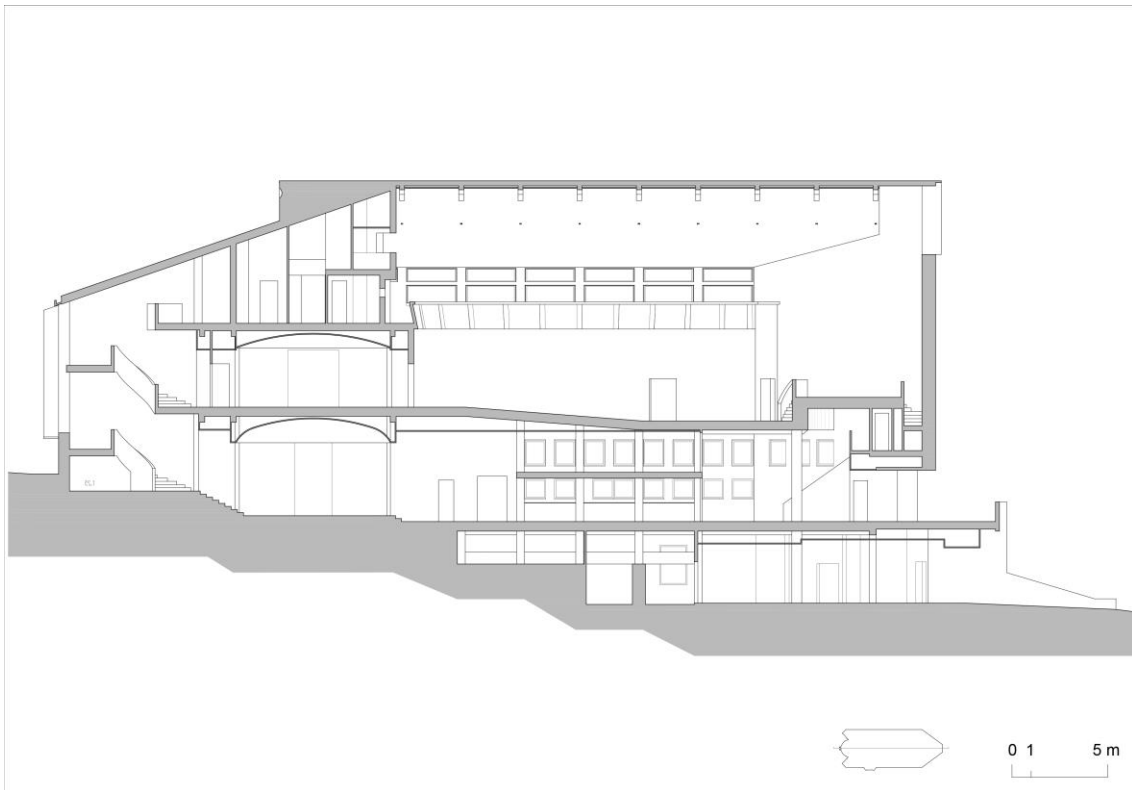




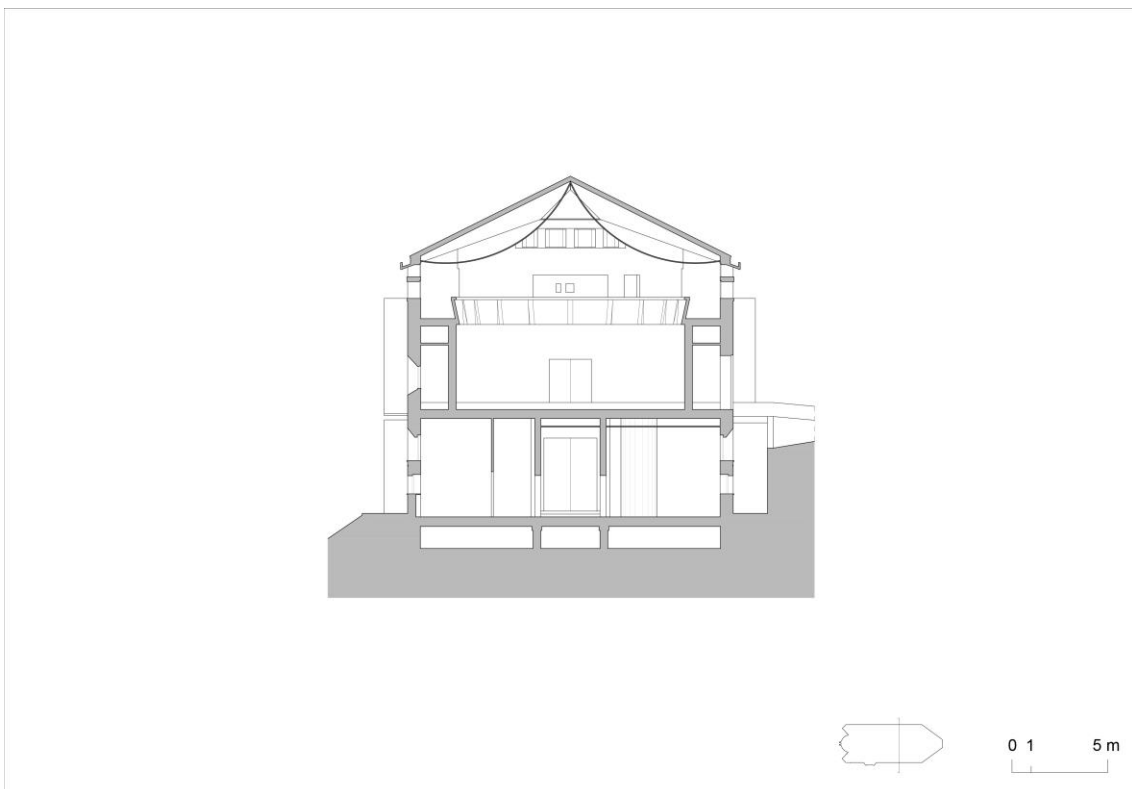
picture 25: detail of the bricks texture and of the window intrados



picture 26: inner of the Anatomical-Surgical Academy Main Hall



picture 27: the Anatomical-Surgical Academy, longitudinal section (Laura Nardi)



picture 28: the Anatomical-Surgical Academy, cross section (Laura Nardi)





picture 29: the Anatomical-Surgical Academy, from outside



picture 30: the Anatomical-Surgical Academy, west side



picture 31: detail of the damaged false ceiling



## **5. Proposal of a methodology of analysis for conservation and reversion: the sheets work**

In the following paragraph the sheet work is presented and described<sup>1</sup>. The methodology here proposed doesn't claim to be definitive, but just to be a starting point for future possible developments. In fact, the generalized sheets can be applied to further cases in order to be improved and changed at some of the sections where it is necessary.

### **5.1 The structure of the work**

The aim of the sheet work is to identify the significative elements and characters of the building, object of study that deserve to be preserved<sup>2</sup>. For this purpose, the sheet analysis has been divided in four categories of investigation: in fact, by subdividing the study in several parts to be analysed, the individuation of the features of interest becomes easier. As explained by Prudon<sup>3</sup>, compiling (and, it may be added, summing up) the information concerning the designer and the project, allows to understand the project significance and the significative elements. Besides, when it happens that an element results characteristic from different points of view, the importance of that character is strengthened.

In the four categories the analysis concerns only what is really necessary for reaching the aim. The choice of the categories derives from the suggestions indicated by Prudon that have been here developed according to what it is looked for. Also Prudon had identified four categories, here repeated again<sup>4</sup>:

- the graphic documentation (that is the collection of all the drawings, photographs, sketches made by the architect during the design process);
- the written records related to its design (correspondence, meeting reports...);
- oral histories and interviews;
- literature and newspaper.

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<sup>1</sup> A first presentation of the work concerns the second chapter, where also the state of art of the methodologies for analysing modern and contemporary architectures is explained.

<sup>2</sup> As explained in the first and second chapters.

<sup>3</sup> In Prudon 2008, p. 168 and mentioned here in the second chapter.

<sup>4</sup> See the previous note.

The chosen categories in the methodology here proposed are the following:

1. The bibliographical investigation<sup>5</sup> concerns what has been written about the designer, from the designer, about the project (included the journals, that especially for the German case study have been fundamental) and about the urban context. In this context, anyway, a selection of the bibliography has been done in order to consider only the publications in relation with the case study<sup>6</sup>. In particular, the choice has been focused on the publications concerning the same period (written by the designer) and the same typologies of buildings, in addition to the typologies that are important to be compared to the case study<sup>7</sup>. As regards the publications concerning the designer, a selection hasn't been done because all the publications regarding the designer can be important. Finally, the aim of the publications concerning the urban context is to understand the building's historical-architectural-typological context in which it has been inserted. Moreover the oral testimonies are considered in this category, but for both the case studies collecting them hasn't been possible.

2. The archival investigation<sup>8</sup> concerns the original projects documentation (in particular the drawings) and the urban planning. This documentation is available because of the recent dating of the considered buildings. As concerns the urban planning, for complete information it is necessary also to look for some dedicated publications, in addition to the archival documentation; these publications have been considered in the bibliographical investigation.

3. The graphical investigation<sup>9</sup>, concerns the drawings and pictures deriving from the architectural survey. Together with the project drawings they are necessary to understand the building significance, in addition to the changes occurred during the years. These drawings weren't considered in the Prudon analysis.

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<sup>5</sup> See the bibliographical investigation of the German case study at page 161 and of the Italian case study at page 264.

<sup>6</sup> The choice can be a limit of the methodology, since the selection is at the discretion of the one who deals with the analysis.

<sup>7</sup> The choice of further typologies of buildings depends on what it has emerged from the investigation of the previous publications. For example, from the designers' publications it emerges the importance of the industrial architecture in the case of Henn and of the holy architecture in the case of Nicolosi. See in particular pages 191-198 for the German case study and pages 279-284 for the Italian ones.

<sup>8</sup> See the archival investigation of the German case study at page 199 and of the Italian case study at page 285.

<sup>9</sup> See the graphical investigation of the German case study at page 223 and of the Italian case study at page 319.

4. The technical investigation<sup>10</sup>, concerns the tests made on the building itself, aimed to acquire information about the materials, their performance, durability and decay. In particular, the analysis of the types and causes of decay is functional for understanding the designer's aim in respect of the duration of the building and the possible future development.

For each investigated category, an initial index is present in which also the page numbers are indicated, in order to facilitate the sheets consultation. Each category is divided in sections in which the documents are collected and analysed as much schematically is possible in order to gather the most peculiar aspects. In particular:

1. In the bibliographical investigation<sup>11</sup> a first analysis concerns the coeval buildings belonging to the designer in order to make a comparison with the case study; through the selection of publications made by the designer, the designer thinking is defined; through the publications concerning the project (included the journals), a general description of the project is made; through the publications concerning the same typology, the coeval architecture and context and the same urban context, the building is contextualized.

2. In the archival investigation<sup>12</sup> the analysis of all the project graphics is aimed to understand the composition (both in planimetry and in elevation), the relationship between plan and elevation and the differences among various solutions (if much more solutions are present); the analysis of the urban plans graphics are aimed to understand the planning state of art which the projects has had to follow, included its principles, the restrictions and limitations.

3. In the graphical investigation<sup>13</sup> the analysis of the plans is functional for identifying the planimetrical composition, the function of the spaces and the evolution of spaces and functions over time; through the fronts, the composition of the facades, the relationship between empty and filled, the used materials and the coherence with the plan are analysed; through the sections the focus is on the spaces relation and perception and on the comparison with the plans and the fronts; then a general

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<sup>10</sup> See the technical investigation of the German case study at page 244 and of the Italian case study at page 346.

<sup>11</sup> See the bibliographical investigation index at page 361.

<sup>12</sup> See the archival investigation index at page 375.

<sup>13</sup> See the graphical investigation index at page 381.



analysis concerns the relationship between functions and spaces and the individuation of that spaces and devices that are closely related to the intended use and to the typology.

4. In the technical investigation<sup>14</sup> the results are furnished through tables: a first analysis concerns the materials and the construction techniques, in order to identify the structural system and the formal system composition; then the analysis concerns the decay, in order to identify the types of decay involving the building and their degree of severity; through destructive and not destructive tests, the quality of materials is investigated. By analysing the collected data, further observations concerning the link between decay and its causes are made. Finally, a comparison among the case study and some similar buildings made by the same designer is carried out: this is functional to identify the peculiar characters of the analysed building.

The final sheet of each category consists of a summary table which collects all the main information, obtained by the different sections, functional to identify the significative elements of the building (listed in the last column)<sup>15</sup>.

## **5.2 The sheets work of the Institute of Piston Engines in Braunschweig**

The sheet works has been developed on the basis of the German case study. This means that the different sections of each category rely on the available information concerning the building. Being both the building and Walter Henn very known and published, both in the publications of the time and in the most recent literature, the quantity of information was very extended; this has allowed the elaboration of a very complete first sheets work, focusing on many different sections. This extent of information is important for the purpose of the generalization of the methodology<sup>16</sup>. In this paragraph the data emerging from the different sections are reported<sup>17</sup>.

### **1. Bibliographical investigation**

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<sup>14</sup> See the technical investigation index at page 394.

<sup>15</sup> See the last pages of each category (the sheet summary) at pages 373, 379, 392 and 403.

<sup>16</sup> See the next paragraph.

<sup>17</sup> According to the organisation deriving from the application of the sheets work to the second case study.

From the publications concerning the designer it emerges<sup>18</sup> that Henn deals almost exclusively with the industrial buildings, is influenced by the different geographical context (the east and the west Germany), his recurring materials are bricks and concrete but he hasn't a distinctive sign, since he tends to experiment many different solutions during his professional activity.

From the designer's publication it emerges<sup>19</sup> that: his models are represented by the American architecture in addition to the German architects previous to him; his main characteristics consist in the building shape depending on the function; the innovations he introduces concern the equipment housed inside and in the fact that he always looks for realizing buildings as much flexible is possible; his main contributes have been in the field of the industrial architecture since he has realized many publications in different languages, becoming a point of reference in this field; the basis of his thinking concerns the buildings strongly linked to their function: in this respect a building can be simply flexible for the function itself (and subject to changes within the same function), or a simple shell covering the installations and destined to last few years in order to be adapted to different functions; anyway, the essence of a building (without including the simple shells types) never becomes obsolete because of the concept that is at the basis of his project.

From the publications concerning the building it emerges<sup>20</sup> that the main peculiarity of the project is the composition of the whole complex of buildings (both in plan and in elevation), including the courtyard, the materials, the composition of the facades. As concerns specifically the laboratory of Piston Engines, the main peculiarity is given by the ventilation system.

From the publications concerning the same typology, coeval architecture and urban context, it emerges<sup>21</sup> that: important historical characteristics are given by the contribution of the complex (like happens for all the new university buildings) in the redefinition of the city image after the war; important urban characteristics consist in the complex following the University development principles of flexibility, multifunctionality and scattering in the green; architectural characteristics are the contemporary

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<sup>18</sup> See at pages 182.

<sup>19</sup> See at pages 184-187.

<sup>20</sup> See at pages 189-190.

<sup>21</sup> See at pages 194-197.

presence of tradition and innovation in the building, given by the use of bricks and concrete, together with the innovative technical devices adopted for the wellness of the workers; an important typological characteristic is given by the strong connection of the building with the function and the specific devices (in particular the ventilation system).

## 2. Archival investigation

From the analysis on the graphics it emerges<sup>22</sup> once again the importance of the composition of the complex, according to which there is a physical and ideal connection among the buildings; the composition of the building, that is characterized by modularity, a regular partition, symmetry of the structure and by the presence of three chimneys; the relationship between plan and elevation, that points out a correspondence between the partitions and between the opposite facades, highlighted by the materials and by the alternation between structure and cladding. Moreover, through the comparison with another solution it emerges that the only difference with the final one was given by the chimneys structure, previously freestanding.

From the urban plans it emerges<sup>23</sup> that: in the planning state of art before the projects there was interdependence between the city and the university plans: according to both of them, the university expansion should occur outside the city boundaries. The two plans change after the Scientific Council's Recommendations. The plan principles suggest the realization of complexes of buildings which should have been multifunctional (double Institutes), scattered in the green, flexible for the future developments, but already with a 10% available extra surface. The buildings should have been preferably realized with prefabricated materials and following the Scientific Council Recommendations; the only limits were economic, because of the difficult situation after the War.

## 3. Graphical investigation

From the plans drawings the main characteristics that emerge are<sup>24</sup>: the link with the other buildings of the complex that are all disposed around the courtyard; the ideal division of the building inner space in three stripes along the longitudinal direction; the

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<sup>22</sup> See at pages 214.

<sup>23</sup> See at pages 221-222.

<sup>24</sup> See at pages 231.

structure modularity; the link between the internal organisation of spaces and the function; the emblem represented by the chimneys that are an external signal of the inner function. The comparison with the project's drawings shows the strong transformation of the complex composition and of the building itself because of the recent works.

From the analysis of the front's drawings it emerges<sup>25</sup> that: there is an alternation between solids and voids concerning the whole complex; the concrete structure on sight is a peculiar character; there is a correspondence between the opposite facades of the building and between plans and fronts.

From the analysis on the sections drawings it emerges<sup>26</sup> that: the building is perceived as an industrial building; entire rooms in the second floor are destined just to house the ventilation system; the tests rooms are connected to the upper and below floors through the ventilation system; the chimneys are integral part of the building since they are connected with it through the basement.

From the analysis concerning the spaces it emerges<sup>27</sup> that: there is a strong relation between the spaces organisation and the function they house; the chimneys are the most representative elements of the building; the building looks like a "machine" housing technical equipment.

#### 4. Technical investigation

From the analysis of the state of decay it emerges<sup>28</sup> that the types of decay are: the vertical and horizontal cracks, the hollows, the crumbles, the carbonation, the moisture in the covering and the scaling, mineral deposits and the corrosion of the reinforcing steel concerning the concrete structure; the loosening of bricks and the mortar loss concerning the cladding. As concerns the decay degree of severity, it emerges that great effect has been given by the building exposure, since in the most exposed facades the degree decay of the structure is greater<sup>29</sup>.

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<sup>25</sup> See at pages 234.

<sup>26</sup> See at pages 236.

<sup>27</sup> See at pages 237-238.

<sup>28</sup> see the table at page 248.

<sup>29</sup> see the table at page 250.

From the tests on materials first of all it emerges their quality<sup>30</sup>: in general both the concrete and the bricks have a good quality, but their conservation status is not so good and better inside than outside; this means that the effect of the exposure has played a considerable effect in the decay progress. Then the link between the decay and its causes has been analysed<sup>31</sup>, taking into account what has emerged from the previous analysis: the main leading causes of decay are the lack of maintenance and the geographical conditions; on the other side the constructive errors, the low quality of materials and the planning errors (or the deliberate choices taken by the designer) haven't been observed.

Through the comparison with other similar buildings made by Henn it has emerged a variety of solutions as concerns the used materials, techniques and devices and, for this reason, the absence of a designer's label.

### **5.3 The sheets work generalization**

The sheet work resulting from the analysis of the first case study is based and built on it and it depends on its characteristics, on the designer's peculiarities, on the context in which the building is placed and, in particular, on the aim of the investigation. Anyway, there are fundamental and constant factors of analysis that have to be considered for any building of any type, epoch, context and made by any designer: first of all the bibliographical investigation, which usually concerns all the made publications relative to the object; the archival investigation concerning the object and (especially for an ancient construction) the further transformations of the object itself and of its surrounding; the analysis of the architectural survey, which is fundamental also for an ancient building.

At the same time, there are peculiar factors relative to the selected field, defined by some specific conditions. In the present research, the defining conditions concern the period of reference (limited to the twenty years after the end of the war), the type of the building (a university building belonging to the here defined functional buildings type) and the aim of the analysis (determining the significative elements and the peculiar

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<sup>30</sup> see the table at page 249.

<sup>31</sup> see the table at page 251.

characteristics). According to this specific field, a peculiarity of analysing the first case study (and so all the buildings which have in common the same specified conditions) concerns the extended available documentation in the archives and the possibility to collect oral testimonies, because of the recent dating of the construction. Then, since the building is defined as a functional building, the aim of the analysis is identifying its peculiar and significative characters which deserve to be protected; this is not necessary for a construction whose value and significance as a monument has been already acknowledged. Finally, because of the aim of the analysis, technical investigations, aimed to study the quality of materials and their state of decay, are fundamental. As concerns the bibliographical investigation, it is selected since all the information aren't necessary (this is true also for the archival documentation); the editing and the analysis of the architectural survey is strictly linked to the aim of the investigation: therefore, the level of detail, the graphic output, the type of survey depend on the final objective and they are not always the same.

Taking into account these considerations, the generalization of the sheet work is aimed to extend the applicability of the methodology of analysis to the greatest number of cases is possible even if, for the moment, by meeting the defined conditions of analysis. The possibility of applying the methodology to many other case studies enables in turn a further generalization. In the generalized sheets work<sup>32</sup>, the layout and the order of the sections are the same used for the first case study; in the empty sheets, there are indications for their compilation and the work is set up through Adobe InDesign in order to simplify the links with pictures, documents and drawings.

#### **5.4 The sheets work of the Anatomical-Surgical Academy in Perugia**

The generalized sheets work is then applied to the analysis of the Italian case study: the Anatomical-Surgical Academy in Perugia. The application to a different building placed in a different context and designed by another architect has revealed the need of adding some data to the various sections, in particular as regards the technical investigation<sup>33</sup>. The main reason is the different geographical context, which requires

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<sup>32</sup> See the sheets at pages 360-403.

<sup>33</sup> The changes occurred to the generalized sheets work after its application on the Italian case study, as such as the results emerging from the different categories, are explained in the next chapter.

different studies on materials. But the changes have concerned most of all the organisation of the sheets work's sections that, through their application to another case study, sometimes have shown not to be well put in order. In the present paragraph, the data emerging from the different sections are reported, according to the present organisation of the four categories.

## 1. Bibliographical investigation

From the publications concerning the designer it emerges<sup>34</sup> that Nicolosi deals mostly with the residential architecture and with the churches, in addition to the numerous urban plans he follows; he is influenced by the geographical contexts in the moment in which he designs his buildings; the materials recurring in his projects are bricks and concrete so much that the bricks texture he draws in detail specifically for each building, represents his label.

The publications concerning the designer himself reveal<sup>35</sup> that the models he follows are Saverio Muratori, Ernesto Nathan Rogers and the Scandinavian Empirism, in particular the architecture of Erik Gunnar Asplund; the main innovation he produces is the double purpose of the bricks texture, both ornamental and technical (in particular acoustic for the big halls); the main contributes he furnishes are the extreme precision, accuracy, methodological coherence and study of details: this represents his personal research in the historical-architectural context after the Second World War. His thinking can be summarized in the following concepts: the importance he gives to the minor architecture much more than to the monuments; his conception concerning the new interventions that are seen as an extension of the existing space; the importance attributed to the designer's concept and to the site's specificity that are put at the basis of any project development.

From the publications concerning the project it results<sup>36</sup> that the Great Hall housed inside the building, represents the main space, surrounded by other organic spaces; all of them are characterized by curved walls.

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<sup>34</sup> see at pages 271.

<sup>35</sup> see at pages 274-276.

<sup>36</sup> see at pages 278.

From the publications concerning buildings belonging to the same typology, coeval architecture and urban context, it emerges<sup>37</sup> that: an important historical characteristic of the building is given by its role in completing the scattered University Campus in the city of Perugia; an important urban characteristic of the Campus itself is that it creates new urban spaces, new integrations and connections among the buildings of the historical centre, increasing their accessibility. Important architectural characteristics of the Nicolosi's architecture concern the fact that it is free from any contemporary architecture movement; then its strong interaction with the urban context that is both respected, since his buildings are strictly connected with the place, and also changed, since his buildings modify the connections in the existing urban fabric; the peculiarity of the active role that the Nicolosi University buildings has in the urban context, represents also a typological characteristic.

## 2 Archival investigation

From the analysis of the graphics, it emerges that the composition of the building is characterized by a geometrical and structural regularity; the main Hall is the main space which influences all the others; the curved walls characterize the spaces; the long facades are symmetric and, in all the facades, a certain depth is perceived because of the bricks texture and the recess of the windows frames. Then the relationship between plan and elevation is analysed, revealing the idea of an external massive building, looking like a religious construction, acting like a theca for the inside curved open spaces; besides, the two long sides have an equivalent importance, none of them being the back side. Through the comparison among the different solutions, a detailed study of the bricks texture is emerged in the last version; moreover, the Great Hall spatiality has been reached just in the final version, thanks to the opening of the gallery facing on it and through the roof super elevation and the realization of the false ceiling<sup>38</sup>.

From the analysis of the urban plans it results<sup>39</sup> that the Nicolosi project follows the Zevi's 1957 Master Plan according to which the preservation of the historical heritage is pursued, but without precluding contemporary interventions. In the Plan principles some areas are considered to be preserved because of the presence of historical

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<sup>37</sup> see at pages 290-291.

<sup>38</sup> see at pages 314-315.

<sup>39</sup> see at pages 317-318.



buildings or because of the landscape; the Plan requires a better connection among the new districts and the realization of new service inside them while, for the historical centre, it solicits the restoring of crumbling buildings in order to transfer there different functions. As regards the Academy area, there are no particular limitations in the Plan, except for the maintaining of the visual relation with the historical centre and with the rural landscape surrounding it.

### 3. Graphical investigation

Both from the plans and from the front's drawings it emerges<sup>40</sup> the building image of representativeness. Moreover the plans, as a confirmation of what already shown by the archival drawings, underlines the regularity and the symmetry of the structure, the curved walls characterizing the spaces and the important presence of the Great Hall, which emerges as the space of utmost importance. The fronts reveal<sup>41</sup>: the symmetry along the longitudinal axis, a reference to the ship form in the external outline, the rhythmic disposition of the windows according to three orders and the specific bricks texture.

From the sections drawings it emerges<sup>42</sup> once again the predominance of the Great Hall, the dependence of all the spaces around it on its shape, the image of representativeness and the symmetry along the longitudinal axis. The same concepts are confirmed by the general analysis on the spaces of the building<sup>43</sup>.

### 4. Technical investigation

From the analysis on the state of decay it results that the types of decay are: the vertical and horizontal cracks, the fragile mechanism of the central pillars (involving the concrete), the cave-in of the false ceiling and the cracks on the masonry<sup>44</sup>. As concerns the decay degree of severity, the main effect is shown in the false ceiling's cave-in<sup>45</sup>.

From the tests on materials, it emerges their very good quality, both for the concrete, which results homogeneous, and for the bricks. Also the bars have been tested and

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<sup>40</sup> see at pages 329-330.

<sup>41</sup> see at pages 335.

<sup>42</sup> see at pages 338.

<sup>43</sup> see at pages 339.

<sup>44</sup> see the table at page 350.

<sup>45</sup> see the table at page 352.

their resistance appears good too. In general, the structures present a good conservative status, but they don't meet the necessary seismic performance required for the area in which the building is placed<sup>46</sup>. As concerns the link between decay and causes of decay, it results that the factors that play the greater role are a lack of maintenance and the geographical context (in particular because of the presence of the earthquakes and so, the necessity of a very good seismic performance). Other factors (like the constructive errors, the low quality of materials and the planning errors or the deliberate choices of the designer) aren't considered as causes of decay for this case study<sup>47</sup>.

From the comparison with other similar buildings made by Nicolosi himself, it emerges the recurring presence of the contemporary use of concrete structures and bricks claddings and of the texture drawing of bricks which can be considered the Nicolosi label.

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<sup>46</sup> see the table at page 351.

<sup>47</sup> see the table at page 353.



## 6. Synthesis

### 6.1 Results achieved

The here developed methodology doesn't claim to be complete and resolved. The aim, however, is to bring to the attention and spread the problems concerning all that functional buildings, realized in an historical period of great architectural fervour and that exhibit some peculiarities which deserve to be preserved. These buildings have indeed to be treated as in the case of those constructions, whose historical-architectural value is amply known and shared.

Nevertheless, raising public awareness about the acknowledgement of the importance and the value related to this type of buildings is not enough. In fact, the risk of losing fundamental elements and objects belonging to a so recent heritage (as it has happened for the German case study) is really enormous since the number of functional buildings realized in the twenty years after the war all over Europe is very large, especially in the countries destroyed by the war<sup>1</sup>.

In this respect, making practical this will of preservation becomes essential. Therefore, **the methodology proposed in the present thesis represents an attempt to furnish an operational instrument** which is useful for the designers, who have to analyse functional buildings before an intervention that can modify them. This methodology can be also employed by academics and students in order to analyse abandoned buildings, before that any hypothesis of intervention can be considered. In the first case the time needed for carrying out the analysis before the project is a determining factor and it is important that all the information to be collected in the shortest possible time. In the second case there isn't the same necessity to be fast since there isn't the urgency to find determined answers before the development of a project.

For this purpose, the present work is organised through the sheets and divided in thematic sections: this structure makes the collection of information and the compilation of sheets as easy as possible. For compiling the sheets, it is necessary to find all the

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<sup>1</sup> According to an approximate analysis concerning the building stock in West Germany before the reunification, shows that more than 40% of the buildings realized between 1950 and 1975 were University buildings and that almost 70% were residential buildings. All the actual University buildings and hospitals have been realized between 1960 and 1980. In general, the totality of construction realized in those years, is 40% of the actual total of buildings. Refer to Kohler, Niklaus: Langfristedynamik von Gebäudebeständen am Beispiel der deutschen Hochschulen und Grosssiedlungen der Boomjahre, in: Hassler, Uta; Dumont d'Arayot, Catherine (eds.) 2009, p. 194.

required information, which are fundamental for the building analysis and for giving answer to the initial questions concerning it; for compiling the final tables of each category, it is also necessary making some further observations and summaries concerning the gathered data: all these necessary actions allow both to identify what elements it is due to be preserved, and to be aware of the building significance, which is very often neglected before any work involving a recent construction.

### **6.1.1 The German case study**

**From the application of the sheets work on the German case study**, what comes up are the peculiar elements of the building (and, so, its significance), the architect's intent for the building in terms of duration and an assessment of the last transformation.

**As concerns the peculiar elements**, they are described for each category<sup>2</sup>.

1. From the bibliographical investigation it results that the peculiar elements to be preserved are: the bricks cladding and the concrete on sight, the concept of dependence between the equipment and the function, the composition of the whole complex, a memory of the equipment (in particular the chimneys, that are very significative), the void and the green surrounding the complex<sup>3</sup>.

2. From the archival investigation the resulting peculiar elements are: the modularity of the structure (which represents also a device for making the building as flexible as possible) and the composition of the complex (both in plan and in elevation).<sup>4</sup>

3. From the graphical investigation the resulting peculiar elements are: once again the composition of the whole complex (both in plan and in elevation) and a memory of the original function which can be represented by the chimneys (since they stand also for the symbol of the outside perceiving the building as and industrial architecture much more than an University one and as a machine). Moreover, the connection among the rooms housing the ventilation system can be also different from the actual openings.<sup>5</sup>

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<sup>2</sup> Please refer to the final summary table of each investigation in the sheets work.

<sup>3</sup> See the sheet summary at page 198.

<sup>4</sup> See the sheet summary at page 222.

<sup>5</sup> See the sheet summary at page 243.

4. From the technical investigation the resulting peculiar elements are the bricks cladding and the structure, with the necessary intervention of maintenance, restoration and refurbishment.<sup>6</sup>

**As concerns the designer's idea of duration for the building,** it is possible to say that:

- since from the graphical investigation it emerges a strong dependence between spaces and the original function (in particular as concerns the spaces housing the ventilation system) and this means that Henn was aware about the possibility (or better the certainty) for the building to be changed; since it also results analogous to an industrial building so that Henn shall implement the features belonging to the industrial architecture (and this confirms his attempt to realize a flexible building able to be adapted);
- since from the bibliographical investigation the building results to be flexible, but not a simple shell (according to the two possibilities defined by Henn for the industrial buildings<sup>7</sup>) and Henn indicates that a building has the "property" to last, at least, 50 years<sup>8</sup>;
- since from the archival investigation it results that both the urban planning and the Scientific Council Recommendations required the building to be flexible;
- since from the technical investigation it results that the quality of materials is quite good, the bricks cladding is resistant and furnished of an acoustic insulation and of an air gap as a thermal insulation, the structural problems concerning the concrete are

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<sup>6</sup> See the sheet summary at page 262.

<sup>7</sup> "As observed till now, the general principle for every building is that its lifetime is longer than that of its facilities. This principle can be also applied to the industrial construction: the production methods and the machines change faster than their associated structures. However, since the principle of profitability is also applied to the industrial buildings, there are two consequences: either a building could not depend on its actual production, but it can be built in such a way so that it allows also complete changes within its function; or the structure must completely adapt itself to a special production by being built as simply as possible and representing just a shell covering the machines and the installations which can be then replaced. [...]" (Henn, Walter: *Bauten der Industrie*. Callway, Munich 1955, pp. 16-18). The sentence is also written in the bibliographical investigation at page 187. Translation made by Laura Nardi.

<sup>8</sup> "A building is not a system which responds to different influences, a building is basically a rigid structure that has also the outdated property to have a lifetime of, at least, 50 years." (Henn, Walter: *Industriebau*. *Die Unvereinbarkeit von Objektplanung und Prozeßplanung*, in: *Baumeister*, 12, 1980, pp. 1205-1207). The sentence is written in the bibliographical investigation at page 187. Translation made by Laura Nardi.

due primarily to a complete lack of maintenance during the building life and to the geographical conditions;

it can be probably assumed that **Walter Henn had realized a building destined to last and that he hadn't the intent the building to be irremediably transformed**. On the other side, **he tries to realize a building as much as flexible**, so that it could be easily adapted to the future different requirements and to the developments of the employed machines, devices and research methods.

The economical limits determine some design choices: it is also realistic to suppose that they have influenced the preference for traditional materials and construction techniques, rather than for new, experimental and different modalities (as he tries to do for other constructions).

From all what emerged it is also possible **to give an assessment of the last intervention of transformation** involving the double Institute. The whole complex has been transformed without maintaining the void of the courtyard (because of the realization of the new big three-story building in place of the small garages building), the planimetrical composition and the rhythm of the facades; in the Laboratory for Piston Engines the tests rooms and the chimneys have been demolished and the rebuilt northern façade (in prefabricated concrete slabs) hasn't maintained the original composition and rhythm given by the concrete structure on sight together with the bricks cladding: in this way the inner modular organisation is no more visible from this front. Moreover, in the same façade, the openings have a completely different rhythm compared to the original ones. All these changes are completely in contrast with what emerged from the sheets analysis, since **all that elements and characteristics resulting to be preserved have been lost**. The main reason of a so strong intervention is evidently attributable to the change of function: in fact, the building was strongly dependent on its original function while the new function was completely different with respect to the original one. For this reason, it was surely necessary a change of the inner organisation of spaces, a removal of all that devices (in particular the ventilation system and the related machines) serving the original function, a reclamation of the area from the polluting materials and a renovation of damaged structures. However, all these necessary interventions should have been achieved without the loss of any building peculiar elements.



### 6.1.2 The Italian case study

**From the application of the sheets work on the Italian case study, what comes up** are the peculiar elements of the building (and, so, its significance) and the architect's intent for the building in terms of duration. **As concerns the peculiar elements**, they are described for each category.

1. From the bibliographical investigation it results that the peculiar elements to be preserved are: the bricks texture (that is a Nicolosi's label and a peculiarity of each building, since each time it is specifically designed for the specific building); the visual relationship with the landscape and the historical city; the space of the Great Hall and the curved walls that result to be the main spaces of the Academy. It also results the urban role characterising all the Nicolosi's architectures: this could suggest, for a future intervention, the importance to enhance the one belonging to the Academy, even if it isn't placed in the historical urban context; indeed it could become itself a renewing element in the marginal context in which it is placed, thanks to its representative image and spaces.<sup>9</sup>

2. From the archival investigation the resulting peculiar spaces are the Great Hall and the curved walls; the characteristic elements to be maintained are the façade composition, the symmetry between the long sides and the bricks texture, which also gives the external perception of a massive wall.<sup>10</sup>

3. From the graphical Investigation once again it emerges that the most representative elements to be preserved are: the Great Hall space, the curved walls, the bricks texture and the idea of representativeness, also given by the external shape.<sup>11</sup>

4. From the technical investigation it results that the false ceiling is an important element to be preserved, since it characterizes the space of the Great Hall, but it needs to be restored; moreover the curved masonry walls deserve to be maintained also because they are structural. From a comparison with other similar Nicolosi's buildings, a confirmation of the importance attributable to the bricks texture comes again to light:

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<sup>9</sup> See the sheet summary at page 284.

<sup>10</sup> See the sheet summary at page 318.

<sup>11</sup> See the sheet summary at page 345.

in fact, it is always used together with the concrete structure, and they can represent in this way a marker of his architecture.<sup>12</sup>

As concerns **the designer's idea of duration for the building**, it is possible to say that:

- since one of the characteristics come to light is the idea of representativeness that Nicolosi wanted to communicate through this building;
- since through the tests on materials it has resulted that all of them have a good quality and a good performance;
- since from the analysis of the causes of decay it has emerged that the main role in the materials loss of strength has been played by the lack of maintenance and by the geographical conditions, but not by planning errors or deliberate choices taken by the designer

it can be assumed that **Giuseppe Nicolosi too had realized a building destined to last and that he hadn't the intent the building to be irremediably transformed**. Unlike the German case, the Academy connection to the original function isn't given by technical devices (as happens with the ventilation system in the Laboratory for Piston Engines), but by its characterising spaces, also defined by structural walls; the only peculiar technical expedient is represented by the acoustic role carried out by the bricks external walls, which aren't limited to have an aesthetic function.

## 6.2 Possible future outlooks

The limits of this methodology are:

- the necessary sensibility and awareness of who uses the sheets in selecting the information and in processing the collected data coming to logical conclusions; as well as in the further selection of information for identifying the peculiar elements which have to be preserved.

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<sup>12</sup> See the sheet summary at page 358.

- the lack of oral testimonies for both the two case studies that, anyway, have been included in the sheet generalization. In fact, when it is possible having them, these types of testimonies can represent a very important contribution to be taken into account.
- the limited number of cases to which this procedure has been applied: this means that it is necessary its application to other case studies in order to improve the generalized sheets work and, so, the further applicability to many other cases.

In this regard, for the future case studies it could be useful also applying the methodology changing some defined conditions among typology, geographical context, designer, materials and dating. The best way is to vary each time a character, while keeping fixed the others. In this way there is a better control over the sheets sections which don't work. For example, a first change could concern the typology: the new case studies to analyse could be industrial buildings (instead of university buildings) still realized within the twenty years after the Second World War, in Germany and in Italy, and with a concrete structure and a bricks cladding. However, since Giuseppe Nicolosi hasn't dealt with the industrial architecture, it is necessary also changing the Italian designer: a good comparison could concern an architecture realized for Adriano Olivetti and a possible designer could be Eduardo Vittoria<sup>13</sup>. By proceeding in this way, in the following comparison the German designer too could be changed, maintaining the focus on the industrial typology, the two geographical contexts and the dating. And so on. What shall have to remain unchanged is the attention given to the category of functional buildings and the aim to look for their significance and significative elements.

When the number of analysed cases becomes important, it could become also useful realizing a digital catalogue, easily accessible from all the designers who can quickly find all the information they need. In particular, in case of the abandoned buildings studied by students and researchers before any need of intervention, a smart catalogue collecting the sheets works analysis of a numerous of functional buildings, can represent a precious resource available for the designers who in future have to project their refurbishment and reconversion.

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<sup>13</sup> An interesting building to analyse through this methodology could the Study and Experiences Centre in Ivrea made by Eduardo Vittoria.

### 6.3 Advices

From the experience concerning the first case study, which has showed that all the most characteristic elements have been irremediably lost, it become clear that **there should be an undertaking to avoid future similar cases** (like could happen in future in the case of the Anatomical-Surgical Academy). In fact, these losses mean the damage of a very precious heritage that is evidence of an important historical and architectural period.

For the designers who have to deal with buildings like these and are called to analyse their main characteristics, **it is important not to dwell on the first glance**, because this should be not sufficient; but they should face a deep study. Only with a deep study it is possible becoming aware about the peculiarities of a building that have to be taken into account in any possible intervention.

The deep study, also as it has been conceived in this research, is surely time-consuming and sometimes there is not a lot of available time. For this reason it is also more important **not to achieve an emergency situation**, as happened in the German case study, which was very damaged at the moment of the new intervention; the best way is **investing in the building maintenance during its life**, before it is too late, in order to limit a most serious damage. In fact, the decay due to a lack of maintenance can be avoided or at least contained.



## **Bibliographical references**

- 1931 Nicolosi, Giuseppe: Alcuni aspetti concernenti le costruzioni scolastiche in Germania. Milan 1931
- 1932 Marconi, Plinio: Concorso per il Piano Regolatore di Perugia, in: Architettura. Rivista del Sindacato Nazionale Fascista Architetti, 11., 1932, 8, pp. 423-444
- Nicolosi, Giuseppe: Piano regolatore generale e piani regolatori particolareggiati. I vincoli della Proprietà edilizia, in: Concessioni e costruzioni, 3., 1932, 8, pp. 515-523
- 1934 Nicolosi, Giuseppe: Studio per un piano regolatore di ampliamento di Littoria, in: L'ingegnere. Rivista tecnica e sindacale del Sindacato Nazionale Fascista Ingegneri, 8., 1934, 12, pp. 608-612
- 1936 Nicolosi, Giuseppe: La standardizzazione nell'abitazione collettiva. Organizzazione industriale del cantiere edile, in: Acts of XIII International Congress of architects (Rome, 22-28 September 1935). Rome, 1936
- 1940 Nicolosi, Giuseppe: Caratteri permanenti nelle architetture italiane, in: Augustea. Rivista imperiale del nostro tempo, 15., 1940, 19-20, pp. 9-12
- 1941 Nicolosi, Giuseppe: L'edilizia popolare e l'urbanistica moderna. Rome 1941
- 1948 Henn, Walter: Der Sicherung und der Wiederaufbau historischer Bauwerke. Eine Betrachtung praktischer Denkmalpflege, in: Baumeister, 45. Jg, 1948, 9, p. 305
- 1949 Göderitz, Johannes: Braunschweig: Zerstörung und Aufbau. Statischen Amt der Stadt Braunschweig, Braunschweig 1949
- 1950 Nicolosi, Giuseppe: Estetica e storiografia dell'architettura, in: Rassegna critica di Architettura, 8., 1950, 15, pp. 3-19
- 1953 Nicolosi, Giuseppe<sup>A</sup>: Formazione dell'architetto. Pontificia Università Gregoriana,

Rome 1953

Nicolosi, Giuseppe<sup>B</sup>: Ingegneria e architettura. Radio Italiana Editions, Trieste 1953

1955 Henn, Walter<sup>A</sup>: Bauten der Industrie. Callwey, Munich 1955

Henn, Walter<sup>B</sup>: Industriebau. Callwey, Munich 1955

Henn, Walter<sup>C</sup>: Industriebau und Architektur, in: Baumeister, 52, 1955, 9, pp. 569-575

1957 Göderitz, Johannes; Rainer, Roland; Hoffmann, Hubert: Die gegliederte und aufgelockerte Stadt. Archiv für Städtebau und Landesplanung 4. Wasmuth, Tübingen 1957

Henn, Walter: Neue Industriebauten in den Usa, in: Zentralblatt für Industriebau, 3. Jg, 1957, 10, pp. 341-346

1958 Gorio, Federico: L'Aula Magna dell'Università di Perugia di Giuseppe Nicolosi, in: Casabella Continuità, XXXI, 220, 1958, pp. 15-21

Nicolosi, Giuseppe: Architettura e Urbanistica. Radio Italiana Editions, Turin 1958

1959 Mandolesi, Enrico: L'Aula Magna dell'Università di Perugia, in: Costruire, I, 2, 1959, pp. 30-39

1960 Empfehlungen des Wissenschaftsrates zum Ausbau der wissenschaftlichen Einrichtungen. Teil I. Wissenschaftliche Hochschulen. J.C. B. Mohr, Tübingen 1960

Nicolosi, Giuseppe: Il laterizio nell'architettura, in: Il laterizio nella costruzione. Proceedings of the V National Conference ANDIL (Rapallo, 28-30 May 1959), Rome 1960, pp. 149-168.



Siegel, Curt: Strukturformen der modernen Architektur. Callwey, Munich 1960

Tamms, Friedrich: Architektur und Städtebau in den USA, in Aluminium-Zentrale e. V (eds.): aaa (I). Reisebericht Aluminium in den Architektur USA, Düsseldorf 1960, pp. 24-25

- 1961 Gliederungsplan der Stadt Braunschweig 1945, in: Deutsche Akademie für Städtebau und Landesplanung (eds.): Deutscher Städtebau nach 1945. Essen 1961

Henn, Walter<sup>A</sup>: Entwurfs- und Konstruktionsatlas. Callwey, Munich 1961

Henn, Walter<sup>B</sup>: Industriebau. Band II: Entwurfs- und Konstruktionsatlas, in: Baumeister, 58, 1961, 10, p. 996

Henn, Walter: Über das alte und das neue Bauen, in: Akademie der Wissenschaften und der Literatur: Abhandlungen der Mathematisch-Naturwissenschaftlichen Klasse. Mainz 1961/1965

- 1962 Henn, Walter<sup>A</sup>: Bürogrossraum und Architekt, in: Baumeister, Jg. 7. 1962, pp. 655-666

Henn, Walter<sup>B</sup>: Internationale Beispiele. Callwey, Munich 1962

Kramer, Ferdinand: Hochschulplanung gestern und heute, in: Bauen und Wohnen, 1962, 8, pp. 315-317

Nicolosi, Giuseppe: L'insegnamento dell'architettura, in: ingg-arch-i, rivista tecnica ingegneri e architetti d'Italia, I., 1962

- 1965 De Carlo, Giancarlo: Problemi, progetti realizzazioni dell'edilizia universitaria. CLUVA, Venezia 1965

Henn, Walter<sup>A</sup>: Am Rande, in: Bauen + Wohnen = Construction + habitation =

Building + home: Internationale Zeitschrift, 1965, 19, p. 295

Henn, Walter<sup>B</sup>: Building for Industry. Iliffe books, London 1965

Henn, Walter<sup>C</sup>: Über das alte und das neue Bauen. Verl. der Akad. der Wiss. und der Literatur, Mainz 1965

Nicolosi, Giuseppe: La formazione dell'architetto, in: Rassegna dell'Istituto di Architettura e Urbanistica, I., 1965, 2, pp. 7-18

Neufert, Ernst: Industrializzazione edilizia: coordinamento dimensionale nella teoria e nella prassi industriale. Realizzazioni e prospettive. Edizioni tecniche Bauverlag, Milan 1965

1966 Gesamtplanung der Technische Niedersächsische Hochschulbaugesellschaft (eds.): Gesamtplanung der Technische Hochschule Braunschweig. Neubauamt für die Technische Hochschule Braunschweig – Zwischenbericht 1965/1966. Braunschweig Technische Universität, Braunschweig 1966

Nicolosi, Giuseppe<sup>A</sup>: L'architettura nel mondo di domani, in: Rassegna dell'Istituto di Architettura e Urbanistica, 2., 1966, 5, pp.7-19

Nicolosi, Giuseppe<sup>B</sup>: L'opera dell'Università degli Studi di Perugia sui centri storici dell'Umbria. Report presented to the National Study Conference of the ANCSA, Perugia, May 1966

Nicolosi, Giuseppe<sup>C</sup>: Posizioni ed esperienze sulla questione dei centri storici, in: Rassegna dell'Istituto di Architettura e Urbanistica, 4, 1966

van Eyck, Aldo: University college in Urbino by Giancarlo De Carlo. Zodiac, Milan 1966

1970 Niedersächsische Hochschulbaugesellschaft (eds.): Gesamtplanung der Universitäten Braunschweig, Göttingen, Hannover. Hannover 1970

1971 DBZ (eds.): Bauten für Bildung und Forschung. Museen, Bibliotheken, Institute. Gütersloh 1971

1972 Nicolosi, Giuseppe: Analisi delle tendenze individuabili nel “contesto” in relazione alle caratteristiche delle localizzazioni industriali nel Mezzogiorno, in: Rassegna dell'Istituto di Architettura e Urbanistica, 8., 1972, 24, pp.71-77

1973 Neufert, Ernst: Industriebauten. Bauverlag GmbH Wiesbaden-Berlin, Curt R. Vincentz Verlag-Hannover, 1973

Nicolosi, Giuseppe: Creatività e tecnologia, in: Rassegna dell'Istituto di Architettura e Urbanistica, 9., 1973, 26/27, pp. 7-20

1974 Hart, Franz; Henn, Walter: Stahlbauatlas: Geschoßbauten. Verlag Architektur+Baudetail GmbH, Munich 1974

Koncz, Tihamér: La prefabbricazione residenziale e industriale. Progettazione, fabbricazione, montaggio. Vol III Costruzioni monopiano per l'industria, costruzioni speciali per l'industria, lo sport e la comunità. Edizioni Tecniche, Milan 1974

1976 Kraemer, Friedrich Wilhelm: Zum Wiederaufbau historischer Bauwerke in Braunschweig, in: Denkmalpflege 1975: Dokumentation der Jahrestagung der Vereinigung der Landesdenkmalpfleger in der Bundesrepublik Deutschland; Goslar, 15-20 June 1975. Hannover: Niedersach. Landesverwaltungsamt-Denkmalpflege 1976, pp. 103-106

Carbonara, Pasquale: Architettura pratica. Gli edifici per l'Istruzione e la cultura, vol. 3, tome II. Turin 1976

1978 De Carlo, Giancarlo; Nicolini, Pierluigi: Urbino, in: Lotus International, 18, 1978

1979 Ivani, Enrico: L'Accademia anatomico-patologica di Perugia, in: Costruire, 21., 1979, 113, pp. 1-4

1980 Henn, Walter: Industriebau. Die Unvereinbarkeit von Objektplanung und Prozeßplanung, in: Baumeister, 1980, 12, pp. 1205-1207

1981 Rebecchini, Marcello: Progettare l'Università. Le analisi preliminari e le scelte progettuali di fondo. Kappa, Rome 1981

Rome University, Faculty of Engineering (eds.): Edilizia Universitaria. Spazi funzionali e standards dimensionali. DEI, Rome 1981

1983 Bizzotto, Renata; Chiumenti, Luisa; Muntoni, Alessandra (eds.): Cinquant'anni di professione. Rome 1983

Henn, Walter: Die Bedeutung des Industriebaus für die Architektur des 20. Jahrhunderts, in: Zentralblatt für Industriebau, 29. Jg., 1983, 2

Rebora, Michele: Architetture di Giuseppe Nicolosi per i centri storici. 1950/65, in: Rassegna di Architettura e Urbanistica, 55, 1983

Wilhelm Kraemer, Friedrich; Sieverts, Ernst: Bauten und Projecte. Krämer, Stuttgart 1983

1984 Aicher, Otl (eds): Industriebau. De Verlags – Antstalt Stuttgart, Stuttgart 1984

1985 Henn, Walter: Vom Bauen in unserer Zeit. Akad der Wiss. und der Literatur, Mainz 1985

1986 Fabbri, Marcello (eds.): Architettura e urbanistica in Italia nel dopoguerra: l'immagine della Comunità. Gangemi, Rome 1986

1987 Belardi, Paolo: Il valore del dettaglio: architetture umbre di Giuseppe Nicolosi, in: l'Università, 4, 1987

Böttcher, Roland: Die Architekturlehrer der Technischen Hochschule Braunschweig, 1814-1960. Braunschweig 1987

- 1989 Büttenbender, Ilona: Braunschweig. Richard Borek Stiftung, Braunschweig 1989
- 1992 Oesterlen, Dieter: Bauten und Texte 1946-1991. Wasmuth, Tübingen 1992
- 1993 Henn, Walter: Siemens in Braunschweig, in: Deutsche Bauzeitung: db; Zeitschrift für Architekten und Bauingenieure, 127, 1993, 1, p. 102-112
- 1994 Fohel, Axel: Bauten für Industrie und Technik. Nationalkomitee für Denkmalschutz, Bonn 1994
- 1995 Kertz, Walter; Albrecht, Peter: Technische Universität Braunschweig: von Collegium Carolinum zur Technischen Universität; 1975-1995. Braunschweig Technische Universität, Hildesheim 1995
- 1966 Pump-Uhlmann, Holger: Vom Bildungspalast zum Forschungslaboratorium. Hochschulbauten und –planungen als Spiegel wissenschaftlichen und gesellschaftlichen Wandels – dargelegt am Beispiel der Technischen Universität Braunschweig 1745-1995. Delft Technische Universität, Delft 1996
- Soletti, Adriana; Belardi, Paolo (eds.): Architettura contemporanea in Umbria. Nuove tendenze. University of Perugia, Perugia 1996
- 1997 Busco Ferber, Elena: I restauri delle Officine Fagus, in: Costruire in Laterizio, 1997, 60
- Cellini, Francesco; D'Amato, Claudio (eds.): Mario Ridolfi: Manuale delle tecniche tradizionali del costruire: il ciclo delle Marmore. Electa, Milan 1997
- Dal Co, Francesco: Storia dell'Architettura Italiana. Il Secondo Novecento. Electa, Milan 1997
- 2000 Argenti, Maria; Nicolosi, Giuseppe: Garbatella, Edifici del lotto 51, in: Remmidi, Gaia et.al: Il moderno attraverso Roma. Guida a 200 architetture e alle loro opere d'arte. Palombi, Rome 2000

Friedman, Donald: The investigation of buildings: a guide for architects, engineers and owners. W.W. Norton, New York 2000

Gerbaulet, Sabine; Kuntzsch, Brigitte: Vom Wiederaufbau zur Massenuniversität. Technische Universität Darmstadt, Darmstadt 2000

2001 Harris, Samuel Y.: Building Pathology: deterioration, diagnostics and intervention. John Wiley & Sons, New York 2001

Zevi, Bruno: Storia dell'architettura moderna. Turin 2001

2002 Belardi, Paolo: La necessità della libertà espressiva. Architetture ombre di Giuseppe Nicolosi, in: Belardi, Paolo: Il rilievo insolito, irrilevante, irrilevato. Quattroemme, Perugia 2002, pp. 215-225

Gorio, Federico (eds.): Giuseppe Nicolosi: figura, opere e contesto. Monographic issue of "Rassegna di Architettura e Urbanistica", XXXVI, 106/107/108, 2002

Valacchi, Fabrizio; Roda, Riccardo; Burroni, Enrica (eds.): Progettare nella città contemporanea. Progetti ed opere per Siena. Alinea, Florence 2002

2004 Belardi, Paolo: L'architettura 1946-1959, in: Ponti, Antonio Carlo; Boco, Fedora (eds.): Terra di Maestri, Artisti umbri del Novecento 1946-1959. Edilmond, Città di Castello 2004, pp. 49-54

2005 Argenti, Maria: Architettura, modernità e tradizione nell'opera di Giuseppe Nicolosi, in: Remiddi, Gaia: Studi sul moderno romano. Palombi Editore, Rome 2005, pp. 63-66

Belardi, Paolo: L'architettura 1960-1970, in: Ponti, Antonio Carlo; Boco, Fedora (eds.): Terra di Maestri, Artisti umbri del Novecento 1960-1968. EFFE Fabrizio Editore, Perugia 2005, pp. 43-49

Ferrari, Mario: Il progetto urbano in Italia. 1940-1990. Alinea, Firenze 2005

Gibello, Luca et al. (eds.): Stop&go: il riuso delle aree industriali dismesse in Italia. 30 casi studio. Alinea, Florence 2005

Gori, Riccardo: Rilievo architettonico dell'Accademia Anatomico-Chirurgica di Giuseppe Nicolosi. Dissertation (A.y 2005/2006. Supervisor: prof. Paolo Belardi; assistant supervisor: Valeria Menchetelli). University of Perugia

Merkel, Jayne: Eero Saarinen. Phaidon Press Limited, London 2005

Pisani, Mario: Lineamenti di storia dell'architettura contemporanea. Umbria 1981-2000, in: Ponti, Antonio Carlo; Boco, Fedora (eds.): Terra di Maestri, Artisti umbri del Novecento 1981-2000. EFFE Fabrizio Editore, Perugia 2005, pp. 70-89

Serraino, Pierluigi: Eero Saarinen 1910-1961. Ein funktionaler Expressionist. Taschen, Köln 2005

2006 Belardi, Paolo: L'architettura 1969-1980, in: Ponti, Antonio Carlo; Boco, Fedora (eds.): Terra di Maestri, Artisti umbri del Novecento 1963-1980. EFFE Fabrizio Editore, Perugia 2006, pp. 69-75

Heitefuß, Dieter: Aus Trümmern auferstanden: Braunschweig und sein Wiederaufbau nach 1945; eine Biddokumentation. Heitefuß, Braunschweig 2006

2007 Darley, Gillian: Fabbriche. Origine e sviluppo dell'architettura industriale. Pendragon, Bologna 2007

Wilhelm, Karin; Gisbertz, Olaf; Jessen-Klingenberg, Detlef; Schmedding, Anne (eds.): Gesetz und Freiheit. Der Architekt Friedrich Wilhelm Kraemer (1907-1990). Jovis, Berlin 2007

2008 Belardi, Paolo (eds.): Giuseppe Nicolosi (1901-1981). Architettura Università Città. Conference Acts (19 October 2006). Libria, Melfi 2008



De Long, David G.; Ford Peatross, Carl (eds.): Eero Saarinen: buildings from the Balthazar Korab archive. Norton & Company, London, New York 2008

Prudon, Theodore H. M.: Preservation of Modern Architecture. John Wiley & Sons, New Jersey 2008

2009 Di Biase, Carolina: Il degrado del calcestruzzo nell'architettura del Novecento. Maggioli Editore, Milan 2009

Hassler, Uta; Dumont d'Ayot, Catherine (eds.): Bauen der Boomjahre – Paradoxien der Erhaltung/Architectures de la croissance – Les paradoxes de la sauvegarde. Zurich/Gollion 2009

Mcdonald, Susan: Materiality, monumentality and modernism: continuing challenges in conserving twentieth-century places. Getty Conservation Institute, Los Angeles 2009

2010 Avellino, Raffaele (eds.): Percorsi d'architettura in Umbria. Publisher Centro Italia, Foligno 2010

Canali, Ferruccio: L'architettura del Novecento, in: Avellino, Raffaele (eds.): Percorsi d'architettura in Umbria. Editrice Centro Italia, Foligno 2010, pp. 531-607

Dezzi Bardeschi, Marco (eds.): La conservazione del calcestruzzo armato nell'architettura moderna e contemporanea. Monumenti a confronto. Quaderni di Ananke, 2. Alinea, Città di Castello 2010

Hassler, Uta: Was der Architekt über Stahlbeton wissen sollte. Gfa Verlag, Zurich 2010

Pelkonen, Eeva-Lüsa; Albrecht, Donald (eds.): Eero Saarinen. Shaping the future. Assa Abloy, New Haven 2010

2011 Biscottini, Gioia: L'Architettura contemporanea in Umbria attraverso le riviste (1945-2009). Graduate thesis in architecture (advisor: prof. Ferruccio Canali). Florence University, 2011

Schmedding, Anne: Dieter Oesterlen (1911-1994); Tradition und zeitgemäßer Raum. Wasmuth, Tübingen 2011

2012 Buttolo, Susann; Lippert, Georg (eds.): Walter Henn – die Ästhetik und des Funktionalen. Thelem, Dresden 2012

Duranti, Massimo; et. al. (eds.): UAC. Umbria arte contemporanea. Edition Big Project, Perugia 2012

Gisbertz, Olaf (eds.): Nachkriegsmoderne kontrovers - Position der Gegenwart. Jovis, Berlin 2012

2013 Arcangeli, Luca (eds.): Giuseppe Nicolosi. Scritti 1931-1976. Casa dell'Architettura, Rome 2013

Neuman, David J.: Building type basics for college and university facilities. Hoboken, Wiley 2013

2014 Armetta, Antonella (eds.): Architetture universitarie del 20. secolo e loro modelli di riferimento. Palermo University, Palermo 2014

Barcaccia, Stefano: Temi di città. Perugia/Architetture 1950-2014. Comune di Perugia, Perugia 2014

Schmiechen-Ackermann, Detlef; Otte, Hans; Brandes (eds.), Wolfgang: Hochschulen und Politik in Niedersachsen nach 1945. Wallstein Verlag, Göttingen 2014, pp. 41-52

2015 Pevsner, Nikolaus: I pionieri dell'architettura moderna. Architettura, pittura, design: la storia del movimento da William Morris a Walter Gropius. Garzanti

Elefanti, Milan 2015

- 2016 Gisbertz, Olaf; Hoyer, Sebastian: „Über das alte und das neue Bauen“ – Zu Bauten für Industrie und Wissenschaft von Walter Henn, in: Mainzer, Udo; Werner, Ferdinand (eds.): INSITU. Zeitschrift für Architekturgeschichte, VIII, 2016, 2, p. 276

Tostões, Ana; Ferreira, Zara (eds.): Proceedings of the 14<sup>th</sup> International Docomomo Conference. Adaptive Reuse – The Modern Movement Towards the Future. Docomomo International. Casa de Arquitectura, Lisbon 2016

- 2017 Gisbertz, Olaf: Reflexion und Transformation: Erhalten und Weiterbauen der (Nachkriegs-)Moderne. Braunschweig Technische Universität, Braunschweig 2017

## List of pictures

### Chapter 3

1. 2. 5. and 6. from Gesamtplanung der Technische Niedersächsische Hochschulbaugesellschaft (eds.): Gesamtplanung der Technische Hochschule Braunschweig. Neubauamt für die Technische Hochschule Braunschweig – Zwischenbericht 1965/1966. Braunschweig Technische Universität, Braunschweig 1966. The original is preserved in the Stadtvermessungsamt Braunschweig.
3. from Niedersächsische Hochschulbaugesellschaft: Gesamtplanung der Universitäten Braunschweig Göttingen Hannover 1. Methodische Grundlagen und Zusammenfassung der Ergebnisse. Hannover 1970, p. 26.
4. from Niedersächsische Hochschulbaugesellschaft: Gesamtplanung der Universitäten Braunschweig Göttingen Hannover 2.1. Empfehlungen für den weiteren Ausbau der Technischen Universität Braunschweig. Hannover 1970, p. 87.
7. 9. 10. 12. 13. 15. 17. and 18. author: Heinrich Heidersberger. Picture taken from Buttolo, Susann; Lippert, Georg (eds.): Walter Henn – die Ästhetik und des Funktionalen. Thelem, Dresden 2012.
8. made by the author in June 2016.
11. from the website [www.henn.com](http://www.henn.com) (accessed on 16th March 2016).
14. from Baumeister 11.1964, p. 1233
16. from Bauen + Wohnen = Costruction + habitation = Building + home: internationale Zeitschrift, 18, 1964, p. 207.
19. from the website [www.henn.com](http://www.henn.com) (accessed on 7th June 2016).
20. published in: Deutsche Bauzeitschrift, 11, 1970; Baumeister 9, 1967; Zentralblatt für Industriebau 5, 1970 (scale 1:750).
21. and 23. from the website [www.henn.com](http://www.henn.com) (accessed on 16th November 2017).
22. made by the author in September 2015.
24. and 27. author: Sebastian Hoyer (iTUBS).
25. University Archive (3306-3309, Lageplan, 1960-09-29).
26. in Zentralblatt für Industriebau, 16., 1970, 5, p. 204.
28. 29. and 30. architectural survey through laser scanner carried out by the the Innovation Company of the TU Braunschweig (iTUBS): Zentrum Bauforschung + Kommunikation + Denkmalpflege (Dr. Olaf Gisbertz) and the Institute for Building Documentation (Sebastian Hoyer and Cristoph Müller). Drawings re-elaborated by the author.
31. from Merkel, Jayne: Eero Saarinen. Phaidon Press Limited, London 2005. Author unknown.
32. published in Deutsche Bauzeitschrift, 11, 1970 (scale 1:5).

33. published in Deutsche Bauzeitschrift, 11, 1970; Zentralblatt für Industriebau 5, 1970 (scale 1:2000).
34. made by the author on November 2017.
35. made by the author on February 2016.
36. made by the author on November 2017.
37. made by the author on the base of an aerial photo.

#### **Chapter 4**

1. 2. 3. 4. 5. 6. 7. and 9. taken in Belardi, Paolo (eds.): Giuseppe Nicolosi (1901-1981). Architettura Università Città. Conference Acts (19 October 2006). Libria, Melfi 2008. Author ignored.
8. author: Riccardo Gori.
10. author: Valeria Menchetelli.
11. [www.bing.com/maps](http://www.bing.com/maps)
12. taken from <http://accounts.unipg.it> (accessed on 20th January 2017)
13. taken from <http://www.parrocchiadellavergine.it/> (accessed on 20th January 2017)
14. taken from <http://www.architetturatoscana.it>
15. 16. 17. 21. and 24. copies from the University archive.
18. made by the author on the base of an aerial photo.
19. 20. 22. 23. 27. and 28. architectural survey made by the student Riccardo Gori for his dissertation, checked and re-elaborated by the author.
25. 26. 29. and 30. author: Valeria Menchetelli.
31. author: Massimo Mariani.

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**Attached**



**The German sheets work**

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**publications concerning the designer**

Fischer, Helmut: Die Neubauten der Mathematischen und Physikalischen Institute der Technischen Hochschule Dresden, in: Deutsche Architektur, 9, 1955

Buttolo, Susann; Lippert, Georg (eds.): Walter Henn – die Ästhetik und des Funktionalen. Thelem, Dresden 2012

Walter Henn (1912-2006), in: Bauwelt, 97, 2006, 35, p.3

Gisbertz, Olaf; Hoyer, Sebastian: „Über das alte und das neue Bauen“ – Zu Bauten für Industrie und Wissenschaft von Walter Henn, in: Mainzer, Udo; Werner, Ferdinand (eds.): INSITU. Zeitschrift für Architekturgeschichte, VIII, 2016, 2

DBZ (eds.): Bauten für Bildung und Forschung. Museen, Bibliotheken, Institute. Gütersloh 1971, p. 175-178

**Institute for Piston Engines**

Braunschweig | 1960 | 1961-1965 | Walter Henn

**coeval buildings belonging to the designer**

### **Institute for advanced metals**

Dresden

realization 1950-1954

project 1950

Rektor der TU Dresden (eds), Gebäude und Namen,  
Technische Universität Dresden, Dresden 2003.

Buttolo, Susann; Lippert, Georg (eds.) 2012, p.289.

**Keyword: traditional concrete**



This is a research Institute belonging to the Academy of Science. The Shedhalle in the first floor is particularly remarkable. The structure is made of reinforced concrete such as the finishings.

This building has been the first one Henn's building with a plan roof.

Bibliographical investigation

3

**Institute for Piston Engines**

Braunschweig | 1960 | 1961-1965 | Walter Henn

**Faculty for traffic science**

Dresden

realization 1953-1956

project 1950-1953

Rektor der TU Dresden (eds) 2003.

Buttolo, Susann; Lippert, Georg (eds.) 2012, p.289.

**Keyword: traditional roof**



The Institut for transport and communication is composed by two elongated bodies, arranged in three or four floors with pitched roof and connected to each other through a two-story building. There is also a lecture room building which is realized in the front pointing to the places Fritz and Foerster.

Constructively it is realized in masonry with sandstone finery facade. The lecture room emphasizes much more the verticality structure through the sandstone.

Bibliographical investigation

4

**Institute for Piston Engines**

Braunschweig | 1960 | 1961-1965 | Walter Henn

**Math and Physics Institute**

Dresden

realization 1955-1957

project 1950-1955

Rektor der TU Dresden (eds) 2003.

Fischer, Helmut: Die Neubauten der Mathematischen und Physikalischen Institute der Technischen Hochschule Dresden, in: Deutsche Architektur, 9, 1955, p. 392.

Buttolo, Susann; Lippert, Georg (eds.) 2012, p.289-290

**Keyword: courtyard**



The Institute of Mathematics and Physics is part of the eastern extension of the University Campus. Because of they are U-shaped, they create a terraced courtyard. The instituts consist of three four-story oblique wings and they are connected by flat constructions. To the east, between the buildings and former sports facilities a three-story lecture room isolated the buildings. Constructively it is realized in masonry with sandstone finery facade.

Bibliographical investigation

5

**University of traffic engineering “Friedrich List”**

Dresden

realization 1954-1960

project 1951-1953

Rektor der TU Dresden (eds) 2003.

Buttolo, Susann; Lippert, Georg (eds.) 2012, p.290

**Keyword: monumentality**



The building complex is partly nine-story and partly consisting in a four-story construction which is part of the Institute for Transports and Communication. It is located in the immediate vicinity of the central train station and, for this reason, on the boarder of the university campus. The urbanistic concept, the distribution of the different parts and the structure (reinforced concrete skeleton with a characteristic two-story main entrance) result from the Henn's project (even if not completed). Because of his commitment with the Braunschweig University, Henn's design has been continued by Richard Paulik who has made it much more traditional according to the political demand.

**Siemens & Halske AG, NTF company.**

Braunschweig

realization 1955-1957

project 1955

Deutsche Bauzeitschrift 9/1962, Deutsche Bauzeitung

1/1993, Zentralblatt für Industriebau 4/1958

Henn, Walter<sup>A</sup> 1962, pp.188-189

Buttolo, Susann; Lippert, Georg (eds.) 2012, pp. 151-153, 290



**Keyword: shed-roof**

The buildings which Henn has realized (it is about an improvement) have the function of a laboratory and a warehouse. The main building is composed by three naves covered by a characteristic shed roof and a shell structure such as the Dyckerhoff&Widmann.

The structure is in reinforced concrete, that is prefabricated for the coverings; the external cladding is in yellow bricks, while for the inside the plaster is used; the structure is on sight. The external surfaces are able to house both the foodwater drains of the hall and, inwards, the air ducts for the heating system. The warehouse structure is in steel. The rhythm of the trusses is 8 metres and each one measures 3x14,30 metres.



### Brunsviga maschine Factory

Braunschweig

realization 1956-1957

project 1956

Baumeister 10/1957, Zentralblatt für Industriebau

2/1958, Deutsche Bauzeitschrift 9/1962

Henn, Walter<sup>A</sup> 1962, pp.176-177

Buttolo, Susann; Lippert, Georg (eds.) 2012, pp. 154-157, 290



### Keyword: bricks and concrete

Henn's intervention is about the extension of the production buildings Brusviga, 2500 m<sup>2</sup> in area, distributed among five buildings: a new building for the production, a tower for the staircases, a building for the connection among the new and the existing structures housing the production, a new wardrobe building and a house for the janitors. The project has entailed also the demolition of some old buildings.

The three buildings linked to the production have been realized with a reinforced concrete structure on sight with a steel and concrete covering; the new buildings present different heights, in order to join up with the heights of the existing buildings. The windows are in steel and the cladding are realized with a double layer of bricks among which an air space is left. The realization of the warehouse came after the demolition of an old one-story wooden building meanwhile the new building results from the combination of a reinforced concrete and steel frame and from masonry cladding.

**Friedrich Deckel, Precision mechanics and mechanical engineering**

Munich

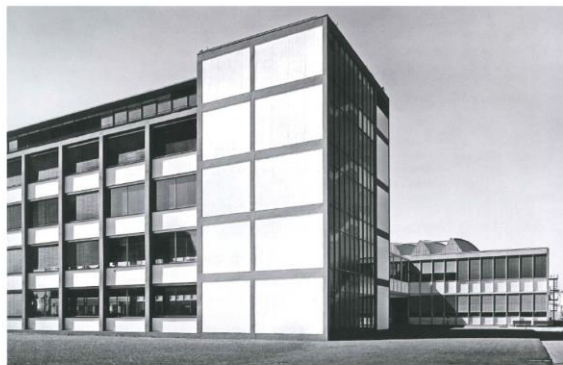
realization 1956-1961

project 1956-1959

B+W 19/1964, Deutsche Bauzeitschrift 9/1966,

Stahlbau 2/1964, Deckel-Echo 4/1957

Buttolo, Susann; Lippert, Georg (eds.) 2012, pp. 158-163, 290



**Keyword: exstensibility**

This building results from the necessity of rebuilding the existing factory, realized in 1903 and destroyed during the Second World War. To take this opportunity, the will is to introduce the new production methods trying to be able to answer at the same time to the future changes and to the changing production processes. In this sense the spaces realized (both for production and administration) are very flexible as regards dimensions and spaces, and easily extensible. In the first phase the building was five-story. In the period 1958/59 another two-story building has been made; in 1962 a further administrative building of seven-story has been built in the northern part. From the constructive point of view, the production hall is made by a reinforced concrete frame, while the administrative building is in steel with a reinforced glass-block.

### **Power station of Siemens-Schuckert**

Wesel

realization 1957-1958

project 1956-1957

Baumeister 10/1961, Deutsche Architektur 2/1966

Buttolo, Susann; Lippert, Georg (eds.) 2012, pp. 164-167, 291



**Keyword: transparency - opacity**

This project results from a competition which Henn won. The first stage of the construction was carried out in the years 1957-1958 and involved the realization of a two-story office building and of a single-story wardrobe building, little buildings, for the storage and big rooms for the production of most of the turbine assembly. Other two-story buildings for connecting the others house social rooms and rooms for the examination of materials. Constructively all the buildings are in reinforced concrete frame that is on sight and highlighted by a different dark colour.

The big production rooms are infilled by glass walls, which are made up by termolux glass in order to avoid a direct light, except for bands of transparent glass for looking outside. In contrast with clearness of the big halls, the smaller are completely opaque, covered by little yellow clinker bricks and only with "psychological windows".

### High Voltage Test Field in the Siemens City

Berlin

realization 1959-1960

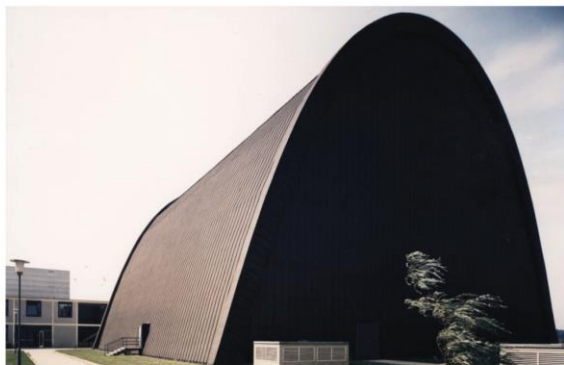
project 1959

Bauwelt 9/1962, Betonbau des Inlandes 10/1963

Zentralblatt für Industriebau 5/1966

Walter Henn<sup>A</sup> 1962, pp. 326-327

Buttolo, Susann; Lippert, Georg (eds.) 2012, pp. 168-171, 291



**Keyword: form - function**

The complex consists of a laboratory building, two little testing halls and a big high tension hall. Henn's project is functional and constructively simple. The laboratory building is of two-story and it is made of a reinforced concrete frame anchored on a long rectangular plan and clad by gray glazed bricks. The structure is on sight and painted white. The window frames are in steel. The two little testing halls are symmetrically embedded in the laboratory building and they are made by a reinforced concrete frame clad by bricks. The form of the big testing hall is given by the idea of realizing a casing around the tension circle. This means the best way for using the space without waste. The realization of the hall has been possible thanks to the collaboration with the company "Beton- & Monierbau" through the scomposition principle and it consists essentially of only two different reinforced concrete parts. Henn decided to dress the hall completely with copper. This building is actually protected as a historical monument.

### **Blaupunkt factory**

Salzgitter

realization 1959-1960

project 1959

Baumeister 10/1961

Buttolo, Susann; Lippert, Georg (eds.) 2012, pp. 172-175, 291



### **Keyword: longitudinally**

The building arises because of the big increase in production in the Hildesheim factory. Salzgitter is chosen for the possibility of expansion it offered and for the good road connections. The project provides for five big halls, an administrative building, a canteen, some storage and dressing rooms. In 1960 two floors had been made with a production hall, the offices and the dressing rooms. The way of production through the assembly line has determined the shapes and the dimensions of the project. The production hall is 200x35 meters and it is shed covered with a curved contour since the installation of the overhead travelling crane wasn't necessary. So the space is free from pillars. The enlightenment is widespread because it occurs through high northbound openings. The longitudinal walls of the production hall are completely opaque, in prefabricated concrete, while the cross-cutting ones are glazed. The service building is in concrete structure with brick cladding.



### Siemens-Schuckert House of designers

Mülheim/Ruhr

realization 1958-1960

project 1957-1958

Deutsche Bauzeitschrift 9/1966, B+W 5/1962,  
Zentralblatt für Industriebau 7/1965, 4/1966, 9/1966

Buttolo, Susann; Lippert, Georg (eds.) 2012, p.176-179,  
291-292



### Keyword: aesthetics

The building has a rectangular shape (56 x 42 metres), is of three plans and it develops around a court. Because of the particular conformation of the plot of land, which presents a slope, the ground floor, the access of the building from the street, becomes a basement compared to the court height, from which the building emerges for two floors. In this way the basement results continuous, since it is not interrupted by the court empty. The fronts, both those facing the external and those internal to the court, such as those in correspondence of the staircases, are completely glazed except for the longitudinal side of the court turned to north-West, being in correspondence of the corridor of distribution of the offices. The structure is frame-type in reinforced concrete according to a modular grid form, the frames are in galvanized steel, thermically isolated and they can be opened in the highest part. The opaque front is in bricks that are covered by polychrome glass of grey colour, while the internal walls of the staircases are in yellow clinker. In this building Henn pays particularly attention not only to the functional aspects but also to the aesthetic, so that to choose it for an exhibition in the Pompidou Centre.

### **TU Main Canteen**

Braunschweig

realization 1961-1962

project 1957-1958

Baumeister 11/1963

Glasforum 6/1966

vitrum 9-10/1966

Buttolo, Susann; Lippert, Georg (eds.) 2012, p.192-195, 293



### **Keyword: in the green**

The University asks for a meeting place as well as a canteen. For this purpose Henn both diversifies internally the spaces and designs three different buildings (a canteen, a student centre and a student house not realized) in order to create a multiplicity of spaces for resting, meeting and for studying not exclusively for eating and drinking. The canteen building is strictly connected to the vegetation which surrounds it through completely glass walls. The use of only steel, glass and aluminium and of a simple geometry (a parallelepiped of a single plan above ground) create a well defined volume highlighting the difference between built and vegetation. The two dining rooms, of different sizes, are set around the kitchen and face the surrounding park also through terraces. In the underground there are the dressing rooms, a bowling and a ping pong room. On this floor the structure is in concrete, while on the canteen floor it is in steel allowing the definition of wide free spaces without pillars.

### Junior factory

Goslar

realization 1962-1963

Deutsche Bauzeitschrift 9/1966, Baumeister 12/1964,  
Zentralblatt für Industriebau 2/1967

Buttolo, Susann; Lippert, Georg (eds.) 2012, p. 293

**Keyword:** *steel-wood*



The building has to meet first of all the criterion of flexibility and aesthetics. In addition a working environment that is positively influenced by a peaceful atmosphere and by the hi-tech context. The planimetrical disposition and the structural aspects have been influenced by the shape and by the position of the plot of land, that is next to a water pool which housed the purification plants of the city. For all the realized buildings the materials choosen are steel for the structure, wood for the trusses of the covering; as concerns the warehouse, concrete slabs for the cladding and wood slabs.



### **Production hall of Varta AG**

Hagen

realization 1962-1963

project 1962

Baumeister 11/1964, 10/1967

Siporex-Information 8/1966

Deutsche Bauzeitschrift 4/1967

Zentralblatt für Industriebau 5/1970 and 6/1967

Buttolo, Susann; Lippert, Georg (eds.) 2012 p.293



### **Keyword: flexibility**

The building is realized in place of the demolished ones because it was not functional anymore. For this reason, the main required characteristic is the flexibility. In this regard the structure is designed according to a node, so that to make possible any future expansion that is considered in the project, as well as any possible change of the inside machines. Moreover the external facades are realized with Siporex sheets, easily dismantling with a view to a future enlargement. In the middle of each walls panel a vertical window has been foreseen so that in the bottom it can be easily converted in door. All the structural elements of the warehouses are in reinforced concrete, differentiated according to the backbone and to the cladding elements. This allowed to limit the activities in the construction site only to the assembling of the prefabricated elements. Both the ventilation and the heating take place naturally in order to allow the installation of the machinery components exclusively in the crawl space.

### Central Warehouse and social building of the City Factory

Braunschweig

realization 1963-1964

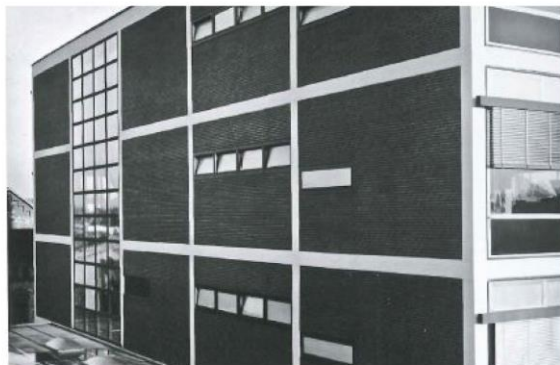
project 1962

B+W 8/1965

Zentralblatt für Industriebau 9/1966

Deutsche Bauzeitschrift 4/1967-7/1974

Buttolo, Susann; Lippert, Georg (eds.) 2012, pp. 201-203, 294



**Keyword: brick and steel**

The intervention is about the design of the central building of the "Energy Public Services" in the city of Braunschweig. The design plan proceeds step by step, starting from a central storehouse of about 7000 m<sup>2</sup> and an administrative and social building. In the following phases the plan considers a canteen, a laboratory, the garages and further storehouses. The objective of the central storehouse consists in rationalising as much as possible the work of the different activities. The administrative and social building houses all the offices which manage the different sectors (gas, water, electrical energy and district heating) and the organization of the work. This last building is three-stores and it is connected to the main warehouse on the ground floor. The offices are open-space and, for them, all the possible acoustical devices have been adopted. From the technical point of view the two buildings are completely different: the central storehouse consists of steel ties with pendulum supports, and it has a span of 20 meters. Walls and roof are covered by a steel sheet and there is a ribbon window of 138 meters all around. The administrative and social building is realized in concrete-frame and bricks cladding according to a 6.50 x 6.50 m modulus and for the windows a cleaning system has been designed.

### Main Osram Administrative Building

Munich

realization 1964-1965

project 1963

Baumeister 10/1966

Deutsche Bauzeitschrift 1/1967

Buttolo, Susann; Lippert, Georg (eds.) 2012, pp. 204-211, 294



### Keyword: light

The complex of buildings includes an Administrative central building of the “research and development center” and a power station. The Administrative building develops on six floors from a square drawing and it is included among the main prominent architectures at international level from the typological point of view with regard to the offices buildings, since it constitutes one of the first european examples of an open space planimetry. The architectural solutions are oriented to make the building a product itself of the Osram company, by conveying the philosophy of transparency: the structure is made by a steel frame clad by completely glazed surfaces (except for a small surface corresponding to a service area) so that what inside happens is visible outside; the building itself is a light source both by day, because the glass transparency is highlighted by the anodized steel windows, and above all by night, when all the inside light is diffused outside.

## Production building of the Aerzen Machine Factory

Aerzen

realization 1962-1963

project 1962

Baumeister 11/1964

Deutsche Bauzeitschrift 4/1967

Zentralblatt für Industriebau 11/1966

B+W 5/1964

Buttolo, Susann; Lippert, Georg (eds.) 2012, p. 294



### **Keyword: flexibility**

The building had to meet the need of the customer: a better organization of spaces and of work phases, the realization of an open gallery for housing the offices and, above all, the possibility to be extended.

It consists of a rectangular flat steel mountable structure (75 x 60 m), of a single plan (6 meters high). The structure is organized according to the regular grid of 15 meters and to the reticular beams trusses located 5 m distance each other. The steel frame structure is functional to the possibility of a future extension, to the free organization of the inner space (which has to house many big machines that may have to be changed over time) and to the installation of the tow truck system.

The north, east and south facade are covered with klinker bricks and crossed by two bands of 1,50 m high windows, one 1,35 m above the level of the floor plating, the second at the same distance from the first. The west side is without windows and made by Siporex concrete blocks so that it can be dismantled in case of future expansion of the building. The roof is walkable so that it is accessible for reparations.

A ventilation system is realized through electric controlled exhaust fans which are arranged on the external walls.

**Institute for Piston Engines**

Braunschweig | 1960 | 1961-1965 | Walter Henn

**Institute for Industrial Engineering and  
Operations Research**

Braunschweig

realization 1964-1966

project 1963

in: Baumeister 9/1967, Deutsche Bauzeitschrift

11/1970, Zentralblatt für Industriebau 5/1970

Buttolo, Susann; Lippert, Georg (eds.) 2012 pp. 218-  
221, 295

**Keyword: concrete**



The double Institute is next to the Double Institute for Piston and Current Engines in the University of Braunschweig. It consists of one four-floors building in which all the necessary functions are housed (offices, study rooms, laboratories, a library and a big experimental room). Both in the ground and first floor a central corridor serves the different rooms. The testing room is double-height starting from the basement with an open galery above that is realized by movable steel platform. The structure is made by a reinforced concrete frame with a concrete prefabricated cladding provided from inside with a three-layer insulation.

Bibliographical investigation

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**comparison with the investigated building**

- Henn deals almost exclusively with industrial buildings. Differently he realizes university buildings, in which his design thinking applied to the industrial typology is however present (for example in designing the Braunschweig university canteen the reference to the assembly line is evident in the organization of the path of food and people).
- The change of style following the transfer from Dresden to Braunschweig is evident: in Dresden Henn realizes architectures able to be part of the rules imposed by the GDR, expression of a restrained monumentality; in the west side of Germany (not only in Braunschweig) he is free to experiment the new shapes, materials and techniques and it is clear he likes to find always new solutions in his work.
- It is not possible to identify a Henn's label which allows to recognise his buildings from those of his contemporary designers. Henn's buildings represent one of the first episodes of new industrial and university architectures realized after the second war. In this respect emerges the attempt to define the criterions of the new architectural episodes and to experiment new devices (technical, material, structural, etc.) in order to meet the new functions and the different demands. Henn's activity appears therefore varied and tied to the individual episodes and to the individual demands. Various are the used materials, techniques, structures and the shapes for meeting whenever both the requests submitted by the customer and the resulting constraints.
- In the Henn's architectures realized in the twenty-years 1950-1965 there is a recurring use of the combination between reinforced concrete frame on sight and bricks cladding (like the investigated Institute). There is not a rule for this recurring: it is used for different functions (administrative, university and production buildings), in different cities, both for extension and for new intervention; however this combination is never alone, but always in conjunction with the use of different materials for the other buildings of the complex, since it is used only when there is a compound, never for an isolated building.

## publications of the designer

Henn, Walter: Grundlagen der Wassermessung mit dem hydrometrischen Flügel: Mitteilungen aus dem Flußbau-Laboratorium der Technischen Hochschule Dresden. VDI-Verl, Berlin 1937

Henn, Walter<sup>A</sup>: Bauten der Industrie. Callwey, Munich 1955

Henn, Walter<sup>B</sup>: Industriebau. Callwey, Munich 1955

Henn, Walter<sup>C</sup>: Industriebau und Architektur, in: Baumeister, 52, 1955, 9, pp. 569-575

Henn, Walter: Der Industriebau – seine Aufgaben und seine Grenzen, in: Baumeister, 54, 1957, 10, p. 695

Henn, Walter: Das flache Dach. Callwey, Munich 1960

Henn, Walter<sup>A</sup>: Entwurfs- und Konstruktionsatlas. Callwey, Munich 1961

Henn, Walter<sup>B</sup>: Industriebau. Band II: Entwurfs- und Konstruktionsatlas, in: Baumeister, 58, 1961, 10, p. 996

Henn, Walter: Über das alte und das neue Bauen, in: Akademie der Wissenschaften und der Literatur: Abhandlungen der Mathematisch-Naturwissenschaftlichen Klasse. Mainz 1961/1965

Henn, Walter<sup>A</sup>: Bürogrossraum und Architekt, in: Baumeister, 59, 1962, 10, pp. 655-666

Henn, Walter<sup>B</sup>: Internationale Beispiele. Callwey, Munich 1962

Henn, Walter<sup>A</sup>: Am Rande, in: Bauen+Wohnen = Construction+habitation = Building+home: Internationale Zeitschrift, 1965, 19, p. 295

Henn, Walter<sup>B</sup>: Building for Industry. Iliffe books, London 1965

Henn, Walter<sup>C</sup>: Über das alte und das neue Bauen. Verl. der Akad. der Wiss. und der Literatur, Mainz 1965

Hart, Franz; Henn, Walter: Stahlbauatlas: Geschoßbauten. Verlag Architektur+Baudetail GmbH, Munich 1974

Henn, Walter: Industriebau. Die Unvereinbarkeit von Objektplanung und Prozeßplanung, in: Baumeister, 1980, 12, pp. 1205-1207

Henn, Walter: Vom Bauen in unserer Zeit. Akad der Wiss. und der Literatur, Mainz 1985

Henn, Walter: Siemens in Braunschweig, in: Deutsche Bauzeitung: db; Zeitschrift für Architekten und Bauingenieure, 127, 1993, 1, p. 102-112

## definition of the designer thinking

### what and who influences the definition of his way of thinking and on which issues

- the education and the first years of training in Dresden

From the educational point of view Dresden has fostered his curiosity regarding the different art forms (behind the interest in technique, Henn took an interest in art and in music). For this reason he attended to both the disciplines of civil engineering and architecture. The years immediately after the war have represented a valuable opportunity for beginning his college career and for being one of the main actors of the city rebuilding (in particular concerning the university campus) together with the colleague Wilhelm Ochs. He deals not only with the realization of new buildings but also with the reconstruction of the historical ones. The attitude he reveals towards the historical buildings that have been damaged by the war is conservative: Henn is actively engaged in a reconstruction which is as much as possible respectful of the remains which, even if limited, represent an historical and cultural memory to be preserved. Within the reconstruction and the enlargement field of the University campus, Henn shows a great capability in being able to respect the numerous restrictions imposed to the planning from the urban point of view as well as economically (in particular the two zoning laws adopted in Dresden in order to underline the ideological break towards the new German Democratic Republic). According to the "Sixteen Urban Planning Principles" in fact, all the new projects should imitate the baroque architecture producing a traditional image of the city. Henn has been able to find a balance between tradition and innovation, while respecting the strict imposed rules, without however characterize his buildings with baroque elements.

#### - his masters

Otto Kirschmer, Heinrich Heiser (in the civil engineering university studies): they guide him during all the technical studies, till the PhD in hydrology. Wilhelm Kreis (in the Academy of Fine Arts) guides him in the monumental modern style which characterized Kreis himself. All of them directed him both towards the university career and towards the planning, creating to him valuable opportunities and contacts which allow him to undertake both professions.

- the education both as an architect and as engineer

He combines art and technique and tries to unify both the competences in a single person. In his projects he unifies functionality with aesthetics.

- the move to Braunschweig

Henn can freely design without the necessity to respect the political obligations and he is free to travel. He finds, together with Friedrich Wilhelm Kraemer and Dieter Oesterlen the "Braunschweiger Schule". He deals with teaching and research at the University and with architectural design both in several design studios he had found, and taking part to the enlargement of the Braunschweig University Campus.

- the "Braunschweiger Schule"

The trio Kraemer, Oesterlen, Henn is completed in 1955, with the arrival of Henn in the TU Braunschweig. The



three professors and designers find themselves in the right place at the right time. Coming from different places and different educations and trainings, the three protagonists complete the different knowledges by providing to the students a training which could integrate the different aspects of the planning (through the Kraemer's functionalism, Oesterlen's formalism and the Henn's structuralism).

- the study tours visiting the American architectures (1955-1959)

the design methodology observed in America, especially in the Eero Saarinen's buildings, becomes for Henn a model for his industrial and university projects. In particular with regard to a Henn's thinking he had already expressed, concerning the attention that the industrial architectures should have in respect of the men who live them, of their need and of their social relationships, being these architectures daily living spaces. For this reason Henn doesn't agree the characteristic of the new American industrial buildings concerning the use of artificial light and air and the lack of windows considering it an unfavourable device not for the people wellness.

#### **the principles for what is he known and stands out**

- researcher in the field of industrial architecture (as a university teacher, designer, writer) he is an international point of reference for the design of the industrial buildings. His publications concerning this topic have been translated in several languages.

- avant-garde, researcher of innovative elements in every project he faces, develops in innovative ways the different designed typologies.

- capability not to be influenced by the limits (especially economic) which are transformed in opportunity for creating functional objects with a simple and elegant shape. The ideal model to follow is the American architecture in contrast with the traditionalist rules imposed by the DDR.

- At the base of Henn's ideology the triad Function, Structure and Shape is always present: Henn's intent is the realization of buildings as much functional as possible, whose shape come not only from the function, but also from the considerations on the structure and from a design idea.

- Even if the technology has brought important changes in the architectural design and in the realization, the architectures aren't comparable with the new industrial products ("ein Auto, eine Maschine, ein Radio") because the buildings are not exclusively linked to the function (like the products are), but they are also expression of a deep intellectual thought which originated them. No matter how old a building get, its essence will be never become obsolete as in the case of cars or machines.

**important sentences based on his written**

“Ein Auto, eine Maschine, ein Radio veralten - ein Bauwerk dagegen kann zwar altern, sollte aber im Grunde genommen niemals veralten. Diese Forderung wird nur dem Bauwerk gegenüber erhoben, nicht aber an eine Maschine gestellt”.

*A car, a machine, a radio get outdated - a building on the other hand can get old, but it should never be out of date. This requirement can be only applied to a building, but never to a machine.”*

(Henn, Walter: Über das alte und das neue Bauen, in: Akademie der Wissenschaften und der Literatur: Abhandlungen der Mathematisch- Naturwissenschaftlichen Klasse. Mainz 1961/1965, p. 322)

“Wie bisher an jedem Bauwerk als allgemeiner Grundsatz festgestellt werden konnte, ist seine Lebensdauer größer als die seiner Einrichtungen. Das gilt auch für den Industriebau. Die Produktionsmethoden und Maschinen verändern sich schneller als die zugehörigen Bauwerke. Da aber in der Industrie der Grundsatz der Wirtschaftlichkeit auch für die Bauwerke gilt, so ergeben sich daraus zwei Folgerungen: Entweder darf sich ein Bauwerk nicht auf die augenblickliche Produktion abstellen, sondern muß so gebaut sein, daß es Veränderungen innerhalb des Betriebes, ja selbst einen vollständigen Wechsel in der Produktion, ohne weiteres zuläßt; oder das Bauwerk muß sich ganz und gar der speziellen Produktion anpassen, indem es so leicht wie möglich gebaut wird und nur noch eine enganliegende Hülle für die Maschinen und Apparate abgibt, die mit diesen ausgewechselt werden kann. [...] Manche Bauten der chemischen Industrie, Kraftwerke u.a. neigen zur zweiten Lösung; Maschinenfabriken, insonderheit feinmechanische Betriebe, Textilbetriebe zur ersten. Dazwischen liegen Werke, wie z. B. die Papierfabriken, Gummifabriken, die sich nach beiden Richtungen hin entwickeln lassen. Für die Bauwerke, die weitgehend unabhängig von der augenblicklichen Produktion errichtet werden, hat sich im anglo - amerikanischen Sprachgebiet der Begriff »flexibility building« eingebürgert. Man kann ihn am besten mit »Mehrzweckbau« übersetzen. Bei solchen Bauten kann sich in dem vom Bauwerk abgesteckten Rahmen, der im wesentlichen durch die Stützenabstände, die Geschoßhöhen und die Belichtungsverhältnisse festgelegt ist, der Arbeitsvorgang verändern. Die Untersuchung über die zweckmäßigen Abmessungen derartiger Bauwerke führt von selbst, da sie nicht auf einen Einzelfall abgestellt sind, zur Normung der Einzelteile und zur Typung der Bauelemente. Ihr charakteristisches Kennzeichen ist die Reibung. Wenn sich aber die Anforderungen an eine Produktionsstätte innerhalb weniger Jahre so verändern können, daß eine Industrieanlage, obgleich sie noch nicht einmal Spuren der Abnutzung aufweist, schon nach kürzester Zeit überholt ist, so verlieren

die Bauwerke im Industriebau ganz allgemein ihren „bleibenden Wert“. Sie werden nicht mehr für Jahrhunderte gebaut, sondern bestenfalls für Jahrzehnte.“

*“As observed till now, the general principle for every building is that its lifetime is longer than that of its facilities. This principle can be also applied to the industrial construction: the production methods and the machines change faster than their associated structures. However, since the principle of profitability is also applied to the industrial buildings, there are two consequences: either a building could not depend on its actual production, but it can be built in such a way so that it allows also complete changes within its function; or the structure must completely adapt itself to a special production by being built as simply as possible and representing just a shell covering the machines and the installations which can be than replaced. [...]”*

(Henn, Walter: Bauten der Industrie. Callwey, Munich 1955, pp. 16-18)

- [...] ein Bauwerk ist kein System, das auf unterschiedliche Einflüsse reagiert, ein Bauwerk ist im Grunde genommen ein starres Gebilde, das zudem noch die unzeitgemäße Eigenschaft hat, eine Lebensdauer von mindestens 50 Jahren zu haben. [...] der Begriff flexibel (ist) nicht zutreffend; man sollte von überdimensionierten Bauwerken sprechen [...]

*“A building is not a system which responds to different influences, a building is basically a rigid structure that has also the outdated property to have a lifetime of, at least, 50 years.”*

(Henn, Walter: Industriebau. Die Unvereinbarkeit von Objektplanung und Prozeßplanung, in: Baumeister, 1980, 12, pp. 1205-1207)

**publications concerning the project**

Institute für Kolbenmaschinen und für Strömungsmaschinen der TH Braunschweig, in: Baumeister, 1967, 9, pp. 1099-1101

Gebäudekomplex der Institute für Kolbenmaschinen und für Strömungsmaschinen der Technischen Universität Braunschweig, in: Zentralblatt für Industriebau, 1970, 5, pp. 203-208

Institute für Kolben- und Strömungsmaschinen an der Technischen Universität Braunschweig, in: Deutsche Bauzeitschrift, 1970, 11, pp. 2133 - 2136

DBZ Gebäudedaten-Institut K+S der TU Braunschweig, in: Deutsche Bauzeitschrift, 1976, 5

Intitut für Kolben- und Strömungsmaschinen der TH Braunschweig, in: Buttolo, Susann; Lippert, Georg (eds.): Walter Henn – die Ästhetik un des Funktionalen. Thelem, Dresden 2012, pp.196-199, 293

Deutsche Bauzeitschrift (eds.): Bauten für Bildung und Forschung. Museen, Bibliotheken, Institute. Gütersloh 1971, p. 175-178\_ <http://www.henn.com/de/projects/education/engineering-institutes>

Das neue Institut füt Kolbenmaschinen der Technischen Universität Braunschweig, in: Motorrechnische Zeitschrift", 32., 1971, 3, pp. 73-77

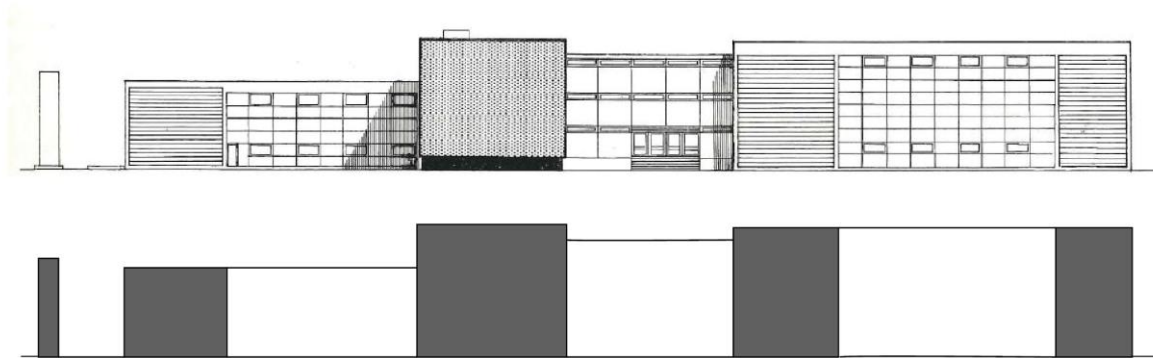
## description of the building

The Institute for Piston Engines of the Technical University of Braunschweig is an architecture that can be considered as much an industrial as an university building. It's about an experimental laboratory for piston engines, in which the cars' and airplanes' motors are tested. The building in question is not isolated, but it's part of a complex, which consists of a double Institute together with the Institute for Turbomachinery. The complex of buildings is composed by four built-bodies arranged around an irregularly shaped courtyard: the building which houses the classrooms, the library, the offices and common spaces for studying is in common with the two institutes and in a centre position; it is connected, through glazed passages, with the two buildings reserved to the two experimental and research laboratories. It was necessary and required, in fact, having connection between the administrative, didactic and the experimental functions. From this also the planimetrical distribution of each building derives. The small construction which houses the garages is backward and separated from the whole complex.

At the plan level the buildings are organized so as to shape an irregular and not completely closed on the side's courtyard which underlines at the same time, through the composition, both a certain detachment from the urban context in which the complex is included and an interrelation among the different buildings. The court is partly physically identified through the buildings, partly perceived through the alignment of the buildings themselves. At the plan level the buildings are organized so as to shape an irregular and not completely closed on the sides courtyard which underlines at the same time, through the composition, both a certain detachment from the urban context in which the complex is included and an interrelation among the different buildings.. Each construction, if individually considered, relate, even if in different ways, with its surroundings showing for each side different fronts, none of which has been designed to be a back side. The two laboratories share outwardly the same materials as well as the appearance of the facades that are divided into modular portions from the structure, which remains on sight. In those two the concrete punctiform structure is longitudinally organised according to a modular system showed up in the façade. They share also the thermolux glass of the windows which safeguards from the direct light, while a stripe of transparent glass is used at eye level. All this leads for both the laboratories a same rhythm between structure and claddings and between solids and voids in the equally oriented facades, resulting therefore coherence in the elevations of the whole complex. The building which differentiates in the planimetry, materials and elevations is the one which houses offices and classrooms. In this three-story construction in fact, the structure is not on sight and the facades are completely recovered by prefabricated concrete sheets; the windows mark out regularly the facades which don't show the same alternation between solids and voids as the laboratories, but resulting much more opaque: the building seems to belong to another complex looking so extraneous to the material of the others to which it is connected. But if observed the façade of the whole complex, in particular from northeast and southwest this opacity appears functional to create a perfect alternation between solids and voids (Figure). The small one-story building of garages shows the structure on sight and the covering in bricks, recalling the style of the experimental halls.

## Institute for Piston Engines

Braunschweig | 1960 | 1961-1965 | Walter Henn



The design qualities are based on the peculiarities of the different activities of both the Institutes. In this sense with regards to the Institute for Piston Engines it was necessary that in the seven testing rooms the acoustic and environmental pollution to be controlled. To do this, the testing rooms are soundproof and provided with a ventilation system able of freshening and cleaning up the air. The fresh air is sucked by a fan and blown into the testing rooms, while the polluted air, which presents the residue of gas of engines and brakes, is sucked through the grids put on the slab in correspondence of the machines, and expelled through the chimneys after purification. The gas of the engines is expelled separately.

**publications concerning the same typology**

Goecke, Helmut: Raumbedarfsprogrammwarmierung und Entwicklung baulicher Konzepte Hamburg: Entwicklungsplan für die Hochschule der Bundeswehr in Hamburg und München. Wischer und Partner, Stuttgart, Heinle 1973

Süberkrüb, Peter: Hochschulbauten in Darmstadt. Bericht über die bauliche Entwicklung. Technische Hochschule, Darmstadt 1977

Seidel, Rita; Gerken, Horst: Universität Hannover 1831-1981. Kohlhammer, Stuttgart 1981

Magnus, Kurt: TUM: 125 Jahre Technische Universität München, 1968-1993. Technische Universität München, Munich 1993

Brachmann, Christoph; Suckale, Robert: Die Technische Universität Berlin und ihre Bauten: ein Rundgang durch zwei Jahrhunderte Architektur- und Hochschulegeschichte. Bauwesen, Berlin 1999

Heinle, Erwin; Heinle, Thoma; Roth, Monika: Bauen für Lehre und Forschung. Dt. Verl.-anst, Stuttgart 2001

Puhle, Matthias: Guerickes Erben: 50 Jahre Hochschulstandort Magdeburg-10 Jahre Otto-von-Guericke-Universität, Accompanying Notebook to the exhibition (Cultural and historical Museum Magdeburg 15.06.-31.10.2003), Magdeburg 2003

**publications concerning the coeval architecture**

Empfehlungen des Wissenschaftsrates zum Ausbau der wissenschaftlichen Einrichtungen. Teil I. Wissenschaftliche Hochschulen. J.C. B. Mohr, Tübingen 1960

Neufert, Ernst: Industrializzazione edilizia: coordinamento dimensionale nella teoria e nella prassi industriale. Realizzazioni e prospettive. Edizioni tecniche Bauverlag, Milan 1965

Neufert, Ernst: Industriebauten. Bauverlag GmbH Wiesbaden-Berlin, Curt R. Vincentz Verlag-Hannover, 1973

Koncz, Tihamér: La prefabbricazione residenziale e industriale. Progettazione, fabbricazione, montaggio. Vol III Costruzioni monopiano per l'industria, costruzioni speciali per l'industria, lo sport e la comunità. Edizioni Tecniche, Milan 1974

Wilhelm Kraemer, Friedrich; Sieverts, Ernst: Bauten und Projecte. Krämer, Stuttgart 1983

Aicher, Otl (eds): Industriebau. De Verlags – Antstalt Stuttgart, Stuttgart 1984

Oesterlen, Dieter: Bauten und Texte 1946-1991. Wasmuth, Tübingen 1992

Föhel, Axel: Bauten für Industrie und Technik. Nationalkomitee für Denkmalschutz, Bonn 1994

Busco Ferber, Elena: I restauri delle officine Fagus, in: Costruire in Laterizio, 60, 1997, pp. 402-405

Merkel, Jayne: Eero Saarinen. Phaidon Press Limited, London 2005

Darley, Gillian: Fabbriche. Origine e sviluppo dell'architettura industriale. Pendragon, Bologna 2007

Wilhelm Kraemer, Friedrich; Wilhelm, Karin; Gisbertz, Olaf: Gesetz und Freiheit: der Architekt Friedrich Wilhelm Kraemer (1907-1990). Jovis, Berlin 2007

De Long, David G.; Ford Peatross, Carl (eds.): Eero Saarinen: buildings from the Balthazar Korab archive. Norton & Company, London, New York 2008

Pelkonen, Eeva-Lüsa; Albrecht, Donald (eds.): Eero Saarinen. Shaping the future. Assa Abloy, New Haven 2010

Schmedding, Anne: Dieter Oesterlen (1911-1994); Tradition und zeitgemäßer Raum. Wasmuth, Tübingen 2011



**publications concerning the urban context**

Kramer, Ferdinand: Hochschulplanung gestern und heute: in: Bauen und Wohnen, 1962, 8, pp. 315-317

Gesamtplanung der Technische Niedersächsische Hochschulbaugesellschaft (eds.): Gesamtplanung der Technische Hochschule Braunschweig. Neubauamt für die Technische Hochschule Braunschweig – Zwischenbericht 1965/1966. Braunschweig Technical University, Braunschweig 1966

Böttcher, Roland: Die Architekturlehrer der Technischen Hochschule Braunschweig, 1814-1960. Braunschweig 1987

Kertz, Walter; Albrecht, Peter: Technische Universität Braunschweig: von Collegium Carolinum zur Technischen Universität; 1975-1995. Braunschweig Technical University, Hildesheim 1995

Pump-Uhlmann, Holger: Vom Bildungspalast zum Forschungslaboratorium. Hochschulbauten und –planungen als Spiegel wissenschaftlichen und gesellschaftlichen Wandels – dargelegt am Beispiel der Technischen Universität Braunschweig 1745-1995. Delft Technical University, Delft 1996

Gisbertz, Olaf (eds.): Nachkriegsmoderne kontrovers - Position der Gegenwart. Jovis, Berlin 2012.

Gisbertz, Olaf: Reflexion und Transformation: Erhalten und Weiterbauen der (Nachkriegs-)Moderne. Braunschweig Technical University, Braunschweig 2017.

**insertion of the building in the historical-urban-architectural-typological context****at historical level**

This is a period of great rebuilding in all the Germany. After the Second World War a large part of the cities are almost completely destroyed. At the same time there are economic difficulties so that the new public buildings, like the Universities, are built at least ten years after the end of the war also because the first main emergency was represented by the lack of houses. These circumstances mean the possibility of redefining the city planning and so their shape. The University buildings, especially the ones concerning the new technical fields, as well as the new industrial buildings, represent a precious opportunity for giving a new meaning to the destroyed cities, for organizing them in a functional way, paying attention to the inevitable future developments, and for experiencing the new techniques and materials, especially the prefabricated concrete. Great and innovative examples come from the international experiences, especially from America, where there are not economic limits and where Germany had "exported" many architects in the years of the war (like Mies van der Rohe) who have become protagonists of the new architecture together with other prominent figures (like Eero Saarinen). In this sense, the biggest contribution comes from the industrial architecture since in this field there is a great use, experimentation and development of the newness. Great ideas come also from Germany itself, looking to the experiences carried out before the second war which had not been possible to develop until the end of the conflicts. In this context for example, the innovative ideas introduced by Peter Behrens and, most of all, Walter Gropius in the first years of the Twentieth Century have a decisive influence in the later architecture: even if at that point they are already old ideas, they are taken up and actually experienced just forty years late, when it is possible. In the Henn's Institute of Piston Engines we can find analogies with the American examples as well as relations with the previous German architecture. In particular in the flexibility of spaces, in the substantial use of glazed surfaces and, most of all, in the close connection of the shape and of the architectural arrangements to the housed function.

**at urban level**

After the Second World War Braunschweig is a city quite completely destroyed, both physically and ideologically. The construction situation is dramatic, as such as the economic resources are very limited for satisfying the necessary rebuilding request. Nevertheless the University reconstruction and development is soon considered already in the first city planning since it is seen as a great opportunity for the "rebuilding" of the city built and cultural identity at the same time. And it represents a model of urbanisation, like of new establishment, even if the presence of big empty green spaces underpins the expansion of the university complexes. In fact, the principles underlying the university development are the flexibility (so that the new Institutes should be able to face the future development of the research instruments and to adapt themselves to the new requirements), the multifunctionality (the different Institutes are grouped in complexes of buildings allowing some economy saving) and the scattering (the complexes of buildings

## Institute for Piston Engines

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Institute for Piston Engines\_Magdeburg



Institute for Piston Engines\_Darmstadt



are spread in the green space, like “islands of buildings”). In this sense, the Institute for Piston Engines can't be seen as an individual object, but it is linked to the other elements of the complex not only from the architectural point of view, but also as regards the urban planning; so that the value of the single architecture is given also by the whole complex and by the relationship of each object with the others.

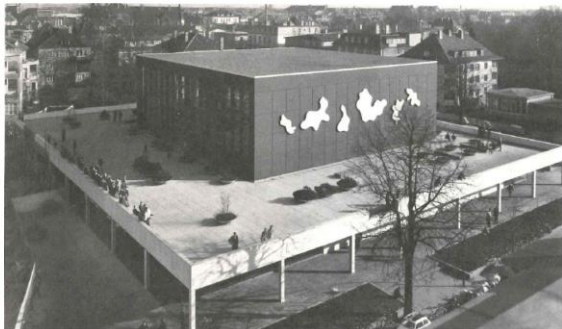
### at architectural level

In the German context it is evident the stylistic difference between west and East Germany. In particular in the west side there is a great desire of innovation which finds the main reference in the American architecture. This new world represents the modern world and it meets the need of releasing a very dramatic recent past. The release is both physical and ideological and it occurs also by using the power of Architecture, taking advantage from the necessity of rebuilding whole parts of cities. Henn feels the need of moving away from the east side rules, and to try the new possibilities of the West. The investigated Institute is both innovative and traditional: it belongs to the traditional brick architecture, as it happens in many buildings designed by the Henn's colleagues of the Braunschweiger Schule. At the same time it is innovative for the German architecture because of its technical devices: Henn gives a personal reading to the American newness and finds for them a personal interpretation. He doesn't agree with the American “psychological windows” so that in this project he pays attention at the same time to the light, that is diffuse thanks to the thermolux glasses, and to the sight towards outside, through the transparent band of glasses at eye level; he doesn't agree also with the only artificial ventilation but he understands the necessity of a ventilation system for the testing rooms, because of the air pollution caused by the engines: in this regard he creates an innovative system for the ventilation, which is very representative for the Institute since entire rooms are destined for housing its equipment while outside it is revealed through the chimneys. At the same time he makes the windows opening when possible. In comparison with his coeval colleagues of the Braunschweiger Schule (Friedrich Wilhelm Kraemer e Dieter Oesterlen) it is evident how Henn is completely focused on the industrial typology and on its devices. Both Kraemer and Oesterlen have a complex catalogue of their architecture, which includes churches, houses, offices, theatres (in particular Oesterlen), schools etc. They work not only in Germany but also in other countries (Kraemer in Jordan and in Saudi Arabia, Oesterlen in Italy, Tunisia, Buenos Aires) while Henn works exclusively in Germany. The two colleagues have also a different complexity in drawing the planimetries which are much more articulated and in which they use many different shapes. But all three are interested in the experimentation of new typologies, new techniques and new materials and in many buildings realized by all of them the combination brick-concrete is very recurring, especially for the University and industrial architectures. A significant difference among them is due to the image and the concept transmitted through their architecture: legibility and linearity in Henn's buildings, solidity and three-dimensionality in the facades of Kraemer, decorative materials and evoking architectures in the Oesterlen's work.



## Institute for Piston Engines

**Friedrich Wilhelm Kraemer**  
Auditorium Maximum\_Braunschweig  
Engineering School\_Gelsenkirchen



Braunschweig | 1960 | 1961-1965 | Walter Henn

**Dieter Oesterlen**  
San Martin Church\_Hannover  
Wilhelm Busch School\_Hannover

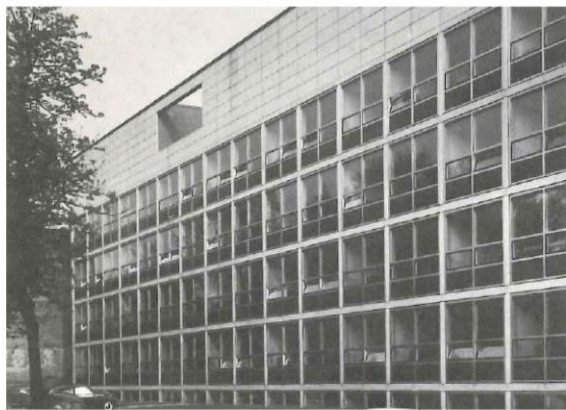


Bibliographical investigation

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## Institute for Piston Engines

**Friedrich Wilhelm Kraemer**  
Electro-technical Institute\_Braunschweig  
Jahrhunderthalle\_Hoechst



Braunschweig | 1960 | 1961-1965 | Walter Henn

**Dieter Oesterlen**  
Chemistry Institute Great Hall\_Braunschweig  
Jesus Christus Church\_Sennestadt  
German soldiers monument\_Futa Pass (Italy)



Bibliographical investigation

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**at typological level**

In the same period of the realization of the investigated building, in all the German University there is a great growth of the number of students. For this reason there is the urgent need to rebuild the old locations destroyed by the war and to build the new Faculties for housing the technical Institutes which require suitable spaces and adequate equipment, in order to enable the Universities to become Technical. In this regard, it is clear that the new buildings housing technical Institutes have to be as much flexible as possible in order to meet the future, inevitable, developments both in terms of number of students and as regards technical evolution in the different research fields. Sometimes the future expansion of the single building is already considered in the project with a free dashed area linked to the drawn building. In other cases free areas for new buildings are considered by the city planning. The Institute for Piston Engines is not always present in the different Universities, even if it is sometimes included in the Institute for mechanical engineering. Through the comparison with some other cases, the peculiarities of the Henn's Institute emerge. In particular because of the typological innovation he introduces, since he creates a specific building for the specific function adopting some specific devices. Despite the economic difficulties, he realizes an object that is extremely functional and aesthetically harmonious at the same time where the design qualities meet the specific requests.

## sheet summary

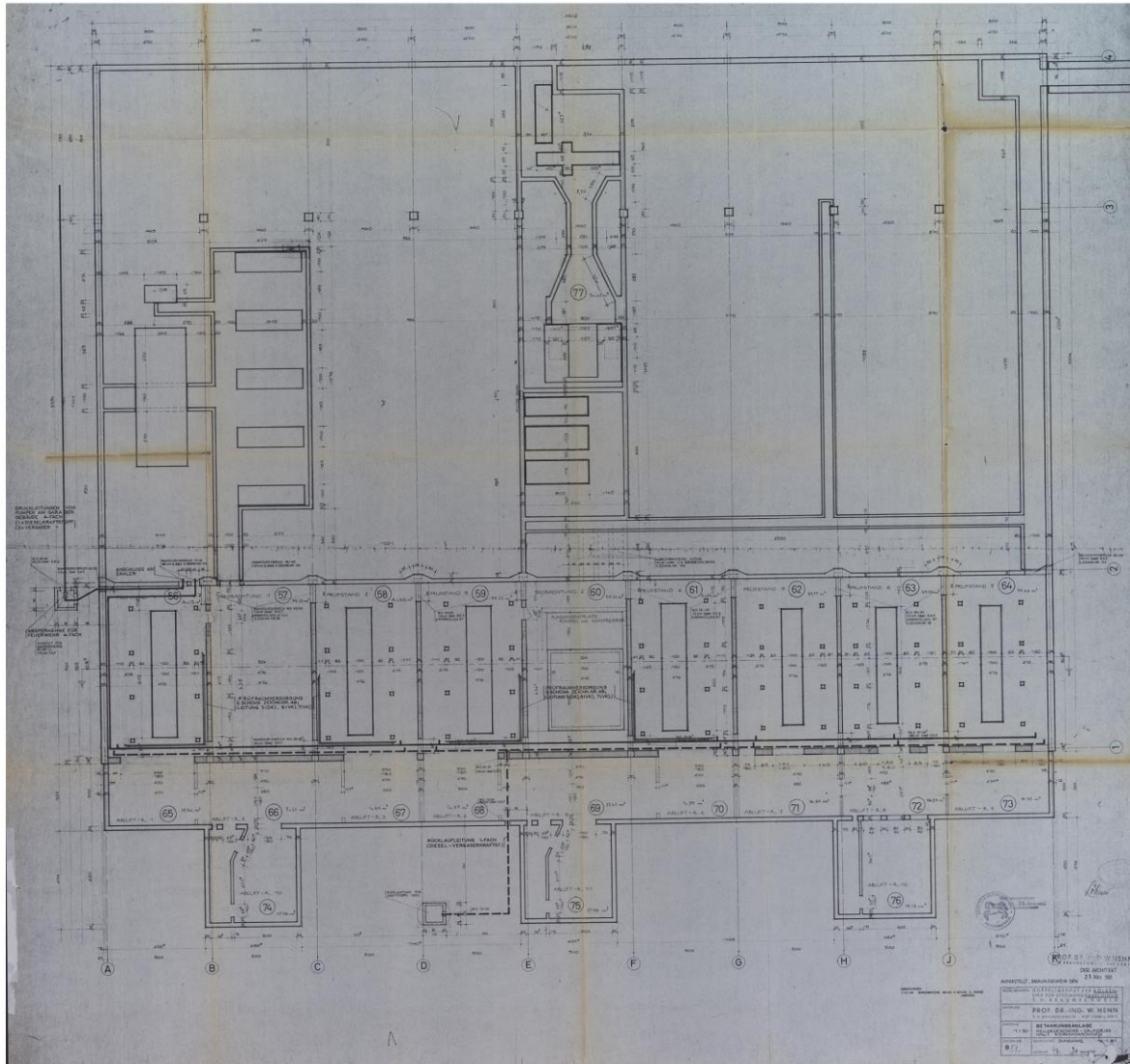
	concerning the designer	what emerges	elements should be preserved
the designer	main typology he deals with	industrial and university	
	influence by the geographical context	<input type="checkbox"/> yes <input type="checkbox"/> no different results in east and west Germany	
	recurring materials	bricks and concrete	brick and concrete on sight
	designer's label	<input type="checkbox"/> yes <input type="checkbox"/> no	
	from the designer's publication		
	models	<input type="checkbox"/> yes <input type="checkbox"/> no American architecture previous German architects (Behrens, Gropius)	
	main innovations	the shape of the buildings depending on the activity, function and on the equipments housed inside; flexibility	meaning of the equipments related to the function
	main contributes	researches and publications in the field of the industrial architecture	
the project	the basis of his thinking	- a building (like the industrial) so linked to its function, has two possibilities: be flexible (and so subject to change) or a simple shell but, in this case, destined to last few years. - the essence of a building (not a simple shell) will never become obsolete	- the building is flexible, it isn't a simple shall. - the building concept
	publications concerning the building		
	main elements	- the composition of the whole complex (plan and elevation) - the courtyard among the buildings - material and composition of the facades - the ventilation system	- composition of the whole complex - a memory of the equipments (chimneys)
	from publications concerning the same typology, coeval architecture and urban context		
	important historical characteristics	the complex contributes to the redefinition of the city expansion (it is part of the new rebuilding after the war)	
	important urban characteristics	the complex follows the University development principles (flexibility, multifunctionality, scattering in the green)	the void surrounding and the green
	architectural characteristics	tradition and innovation (brick and technical devices for the wellness of workers)	- bricks - a memory of the equipments (chimneys)
	typological characteristics	strong connection between function and studied devices (ventilation system)	a memory of the technical equipments (chimneys)

<b>Archival Investigation</b>	
<b>project</b>	
all the graphics	2
analysis	15
composition	
relationship between plan and elevation	
comparison among the different solutions (if any)	
<b>urban plans</b>	
graphics	16
analysis	22
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all the graphics

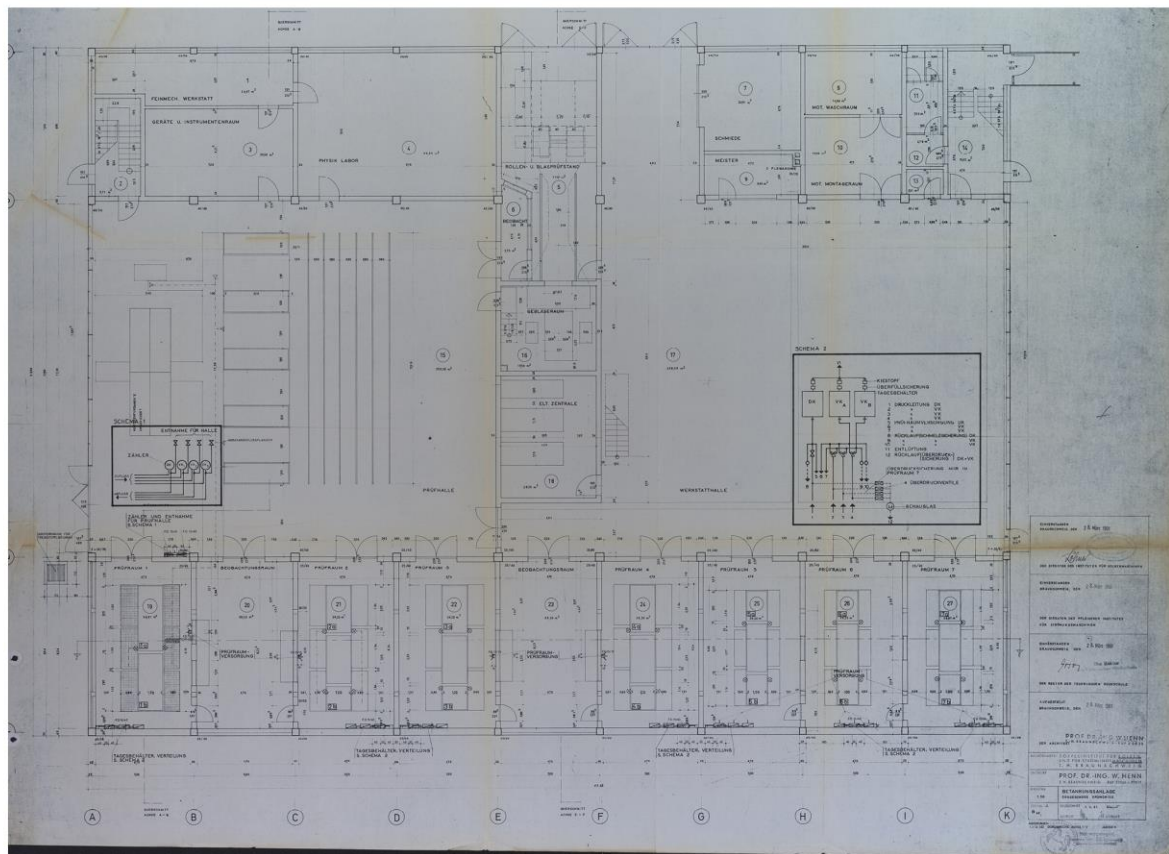
wo\_k\_20471\_aufn\_001



10.1.1961

Archival investigation

2

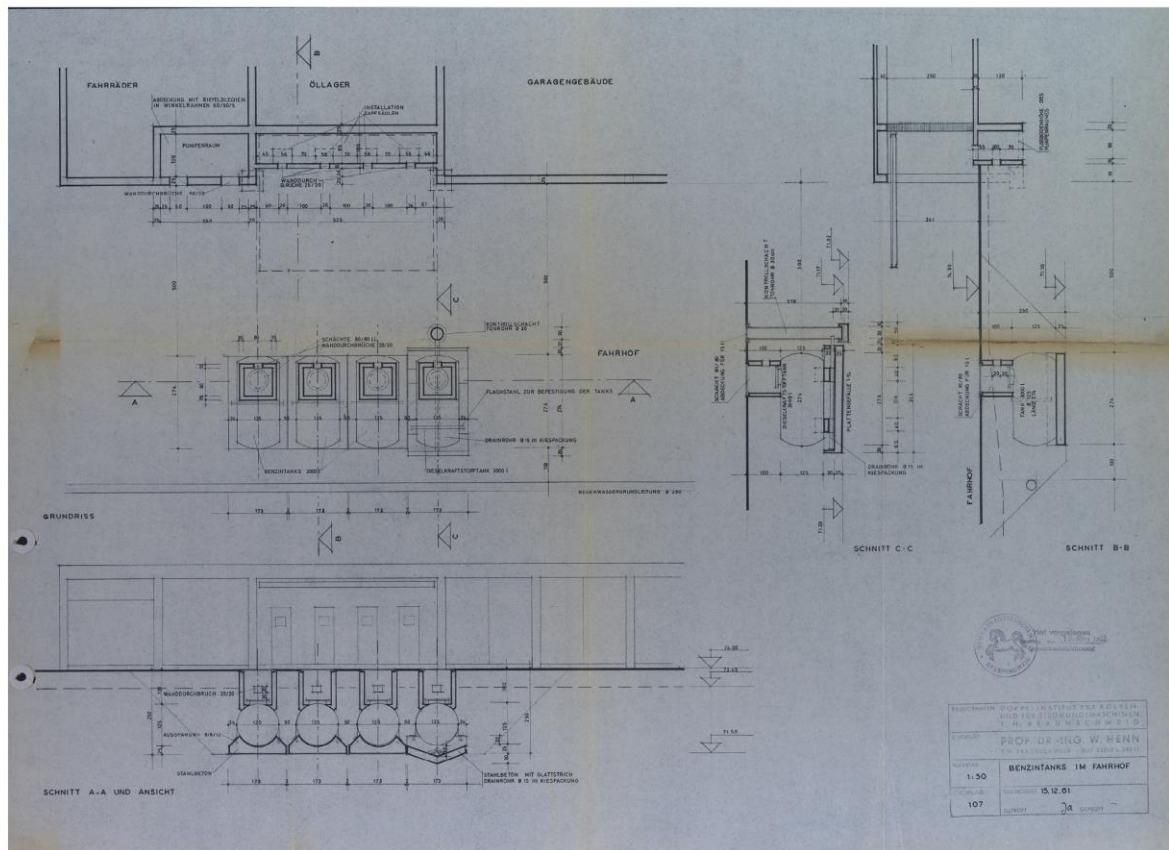


01.03.1961

Archival investigation

3



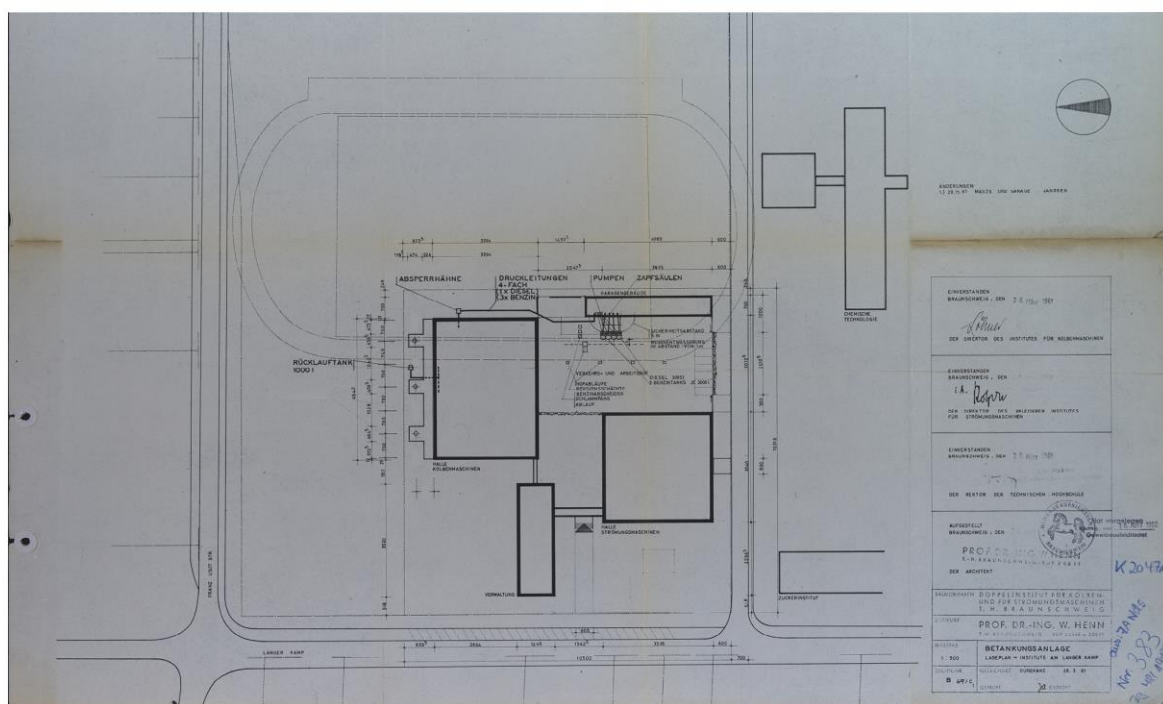


15.12.1961

Archival investigation

5



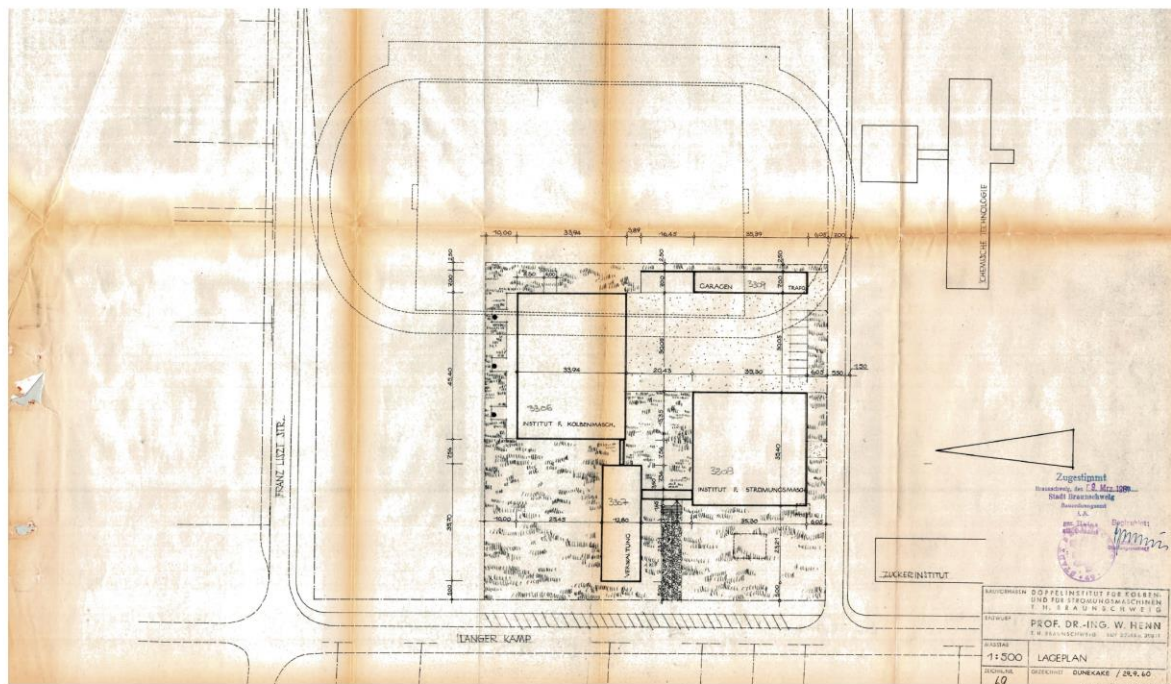


28.03.1961

Institute for Piston Engines

Braunschweig | 1960 | 1961-1965 | Walter Henn

University Archive\_3306-3309\_Lageplan\_1960-09-29



10.1.1961

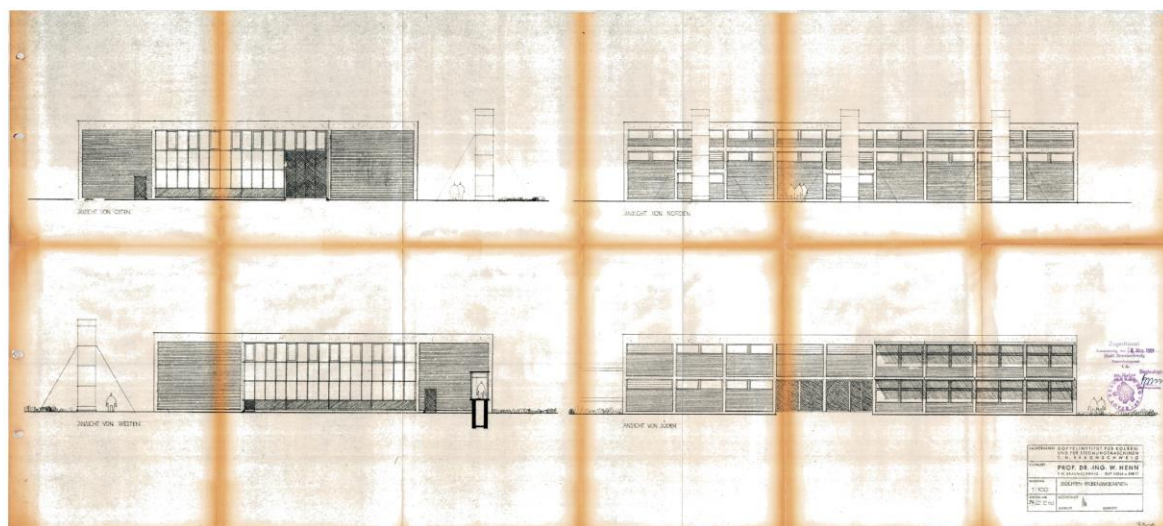
Archival investigation

7

Institute for Piston Engines

Braunschweig | 1960 | 1961-1965 | Walter Henn

University Archive\_3306\_Ansichten\_1-100\_1960-12-22



03.03.1961

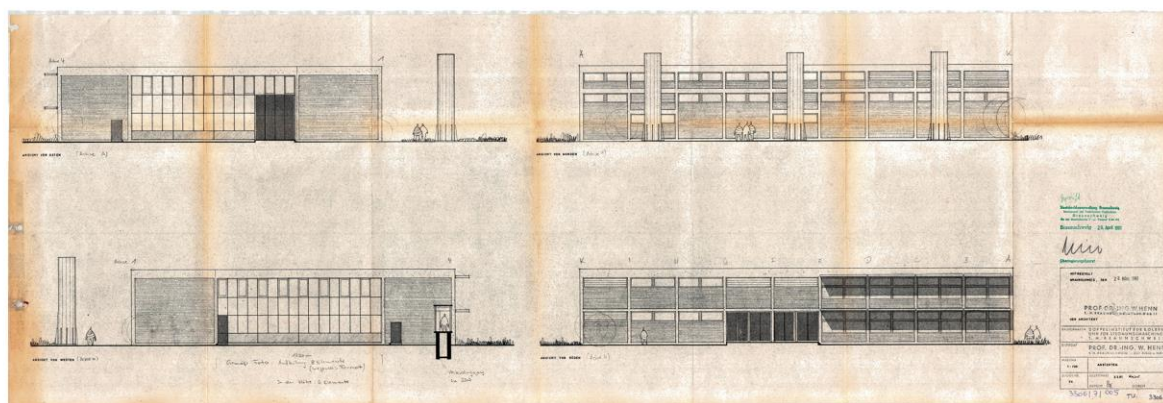
Archival investigation

8

Institute for Piston Engines

Braunschweig | 1960 | 1961-1965 | Walter Henn

University Archive\_3306-7-005\_Ansichten



03.03.1961

### Archival investigation

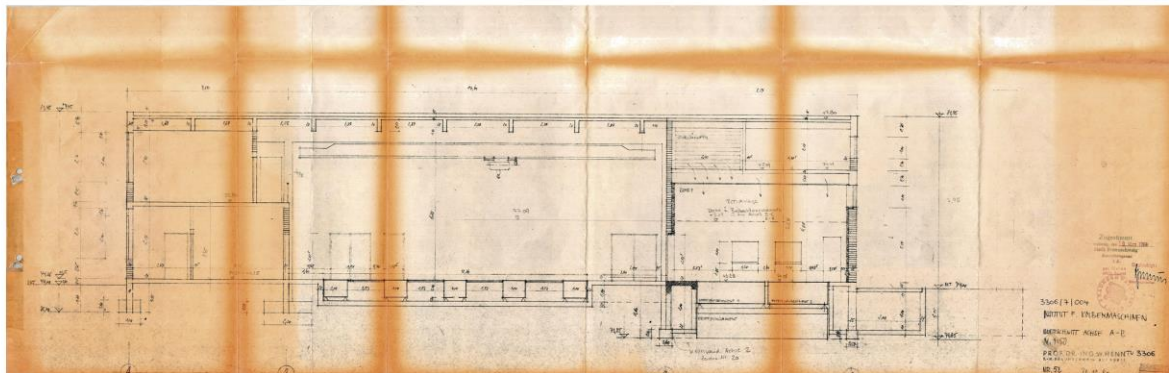
9



Institute for Piston Engines

Braunschweig | 1960 | 1961-1965 | Walter Henn

University Archive\_3306-7-004\_Querschnitt\_Achse A-B

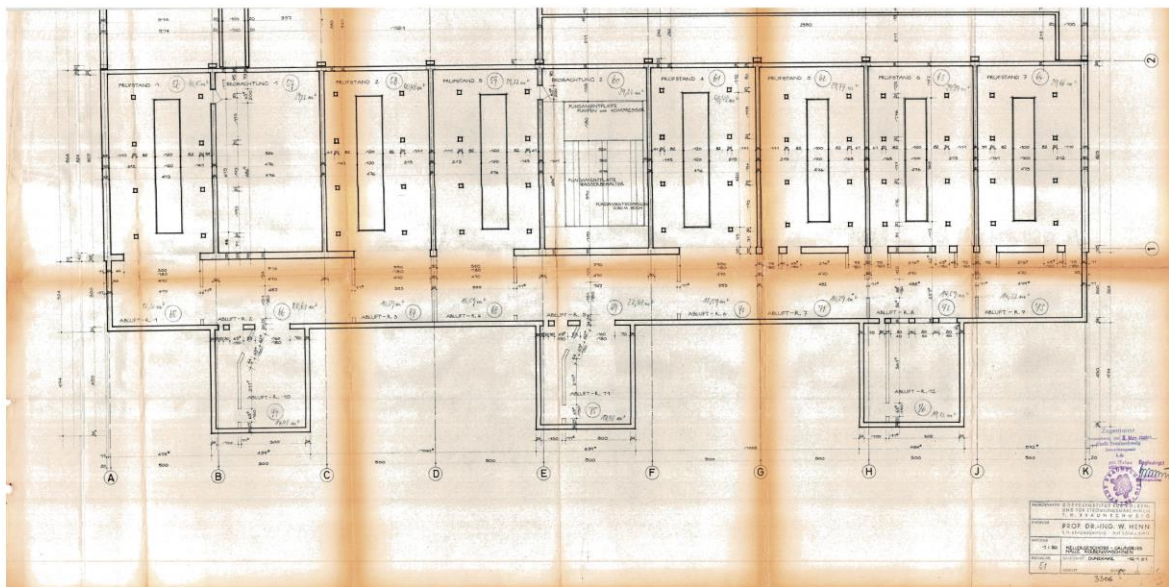


30.11.1960

Archival investigation

10

### Archival investigation

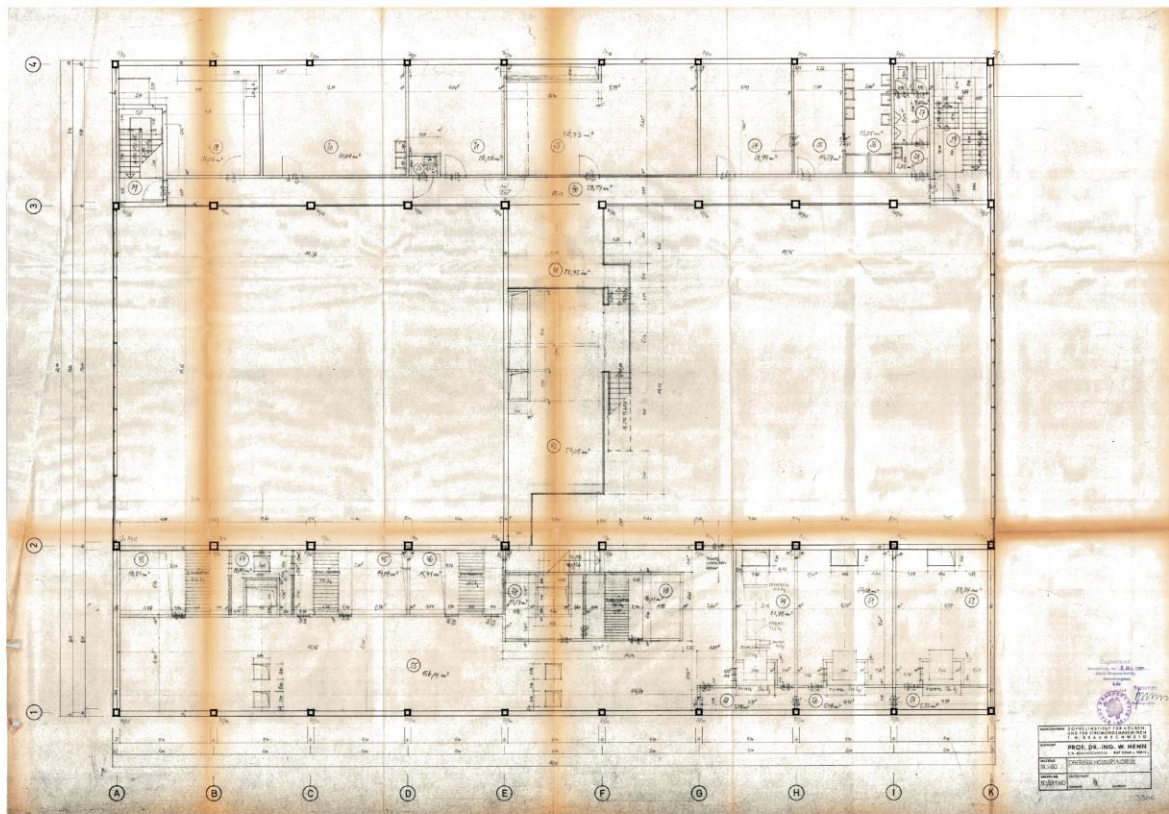


10.01.1961

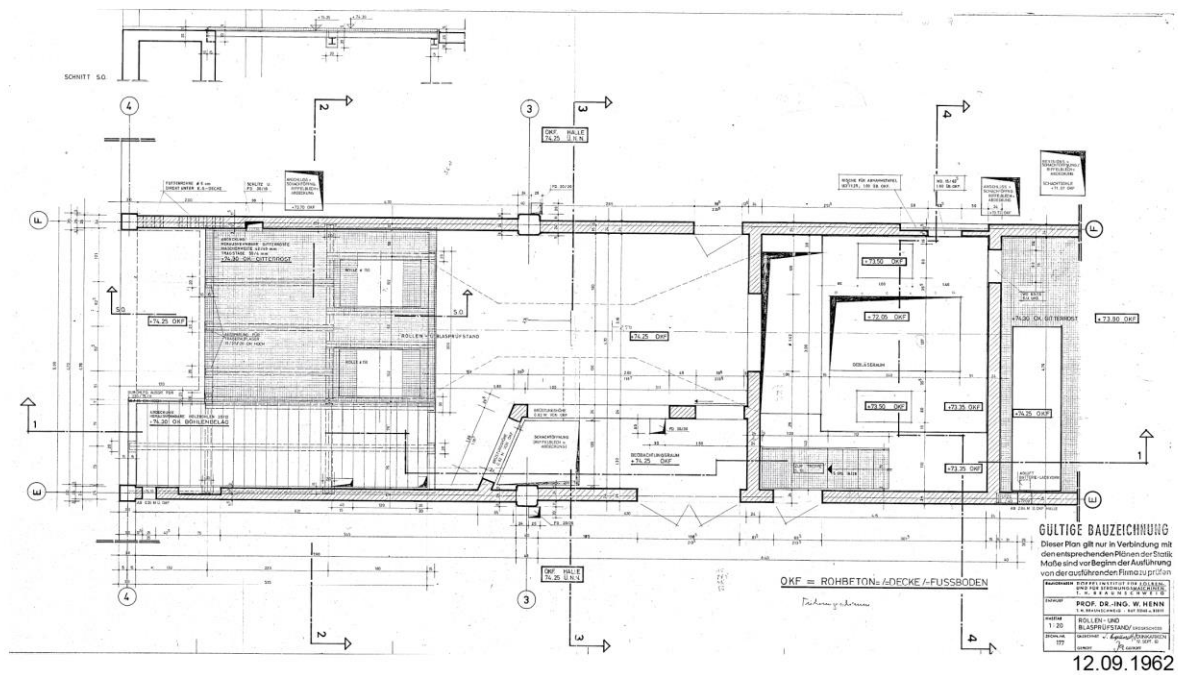
Archival investigation

12





23.09.1960



## analysis

### Composition

First of all it is necessary to consider the **general planimetry** (p. 7) so that the composition of the entire complex can be analysed. It is evident from the drawings that all the four buildings are connected through the traced lines that delimit the single blocks and the outer limit of the whole complex at the same time. In this sense, each block is connected with the other blocks thanks to the alignments among their external volumes. Also the garages building is part of the composition, since it has the same length of the Institute for Current Engine's short side and its main front is aligned with the Institute for Piston Engine's east facade.

Looking at the **plans** (pp. 2, 3, 11, 12, 13) the Institute for Piston Engines is organized according to a modular structure whose main dimension is given by the distance between the pillars. The same pillars divide the building in nine sections along the long side and in three spans along the short one. The central section divides the building in two symmetrical parts and it consists of central continuous bone which houses some of the vertical connections and some service spaces. The two big central spaces on the left and on the right of the central bone are the mechanic's workshops and they externally correspond to the glazed walls of the short sides.

On the **facades** the structure is on sight and it allows understanding how the inner space is organized and divided and that some spaces are double height and other are divided by the slabs. In this way the fronts, like the plans, show a modularity and a regular partition. The different materials take part to the facades composition: together with the concrete (that is white in the drawings) the bricks (represented by horizontal lines) are the opaque materials; the glass for the several glazed walls (as the transparent material, even if it seems to be opaque for the lower row of the short facades); then the doors and the chimneys are probably in metal (different metals). The three chimneys are in the north side (the back of the building, since there are no entrances); they are symmetrical in relation to the axis of the facade: one is in the middle; the other two are in the middle of the second and the second-to-last module.

### relationship between plan and elevation

Between plans and elevations there is a total correspondence because of the structure division which is visible both inside and outside (the concrete is on sight on the facades). For this reason the partitions in plan and in facade are the same and the **facade** composition (pp. 8, 9) is coherent with the internal division. For the same reason, there is correspondence also between the opposite sides (north with south, east with west). The same coherence is shown also in section (in particular, see the drawing at p. 10), where the partitions remain, and the central space is double height (being in this way a big empty space as in the plans).

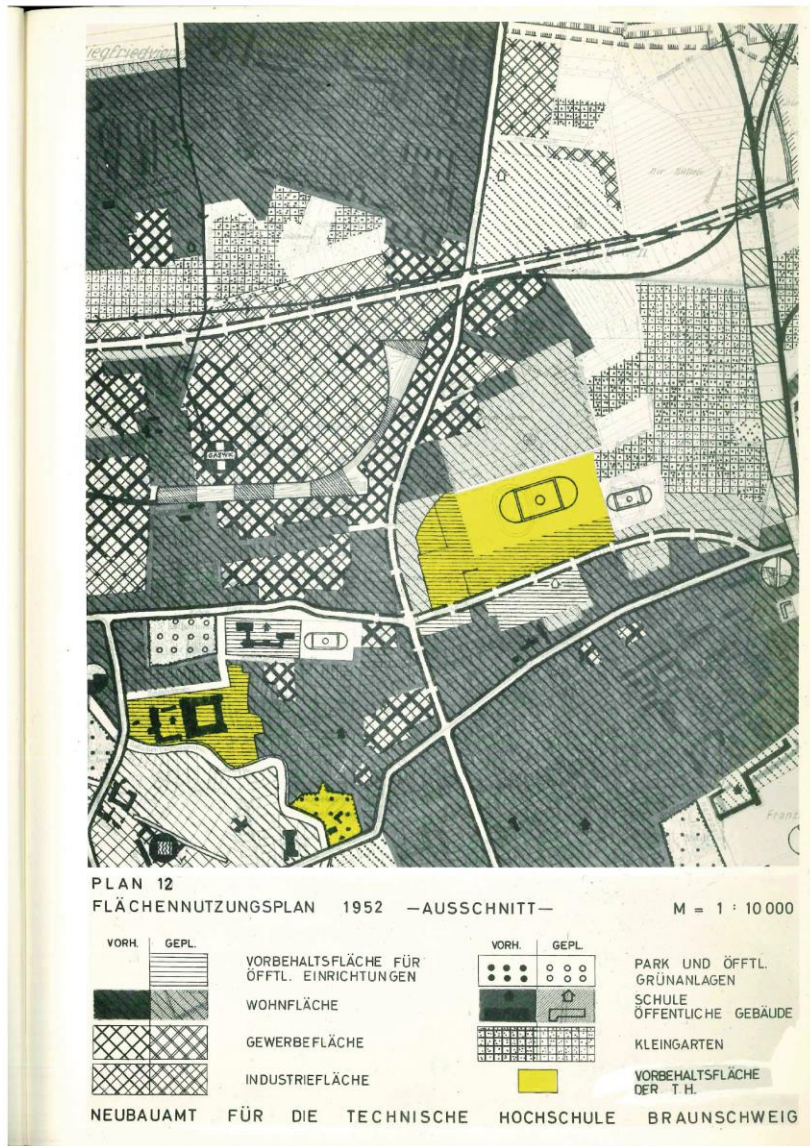
### comparison among the different solutions

The only difference in the drawings is given by the chimneys (pp. 8 and 9), that in the drawing at p. 9 are freestanding, while in the option at p. 8 aren't freestanding.



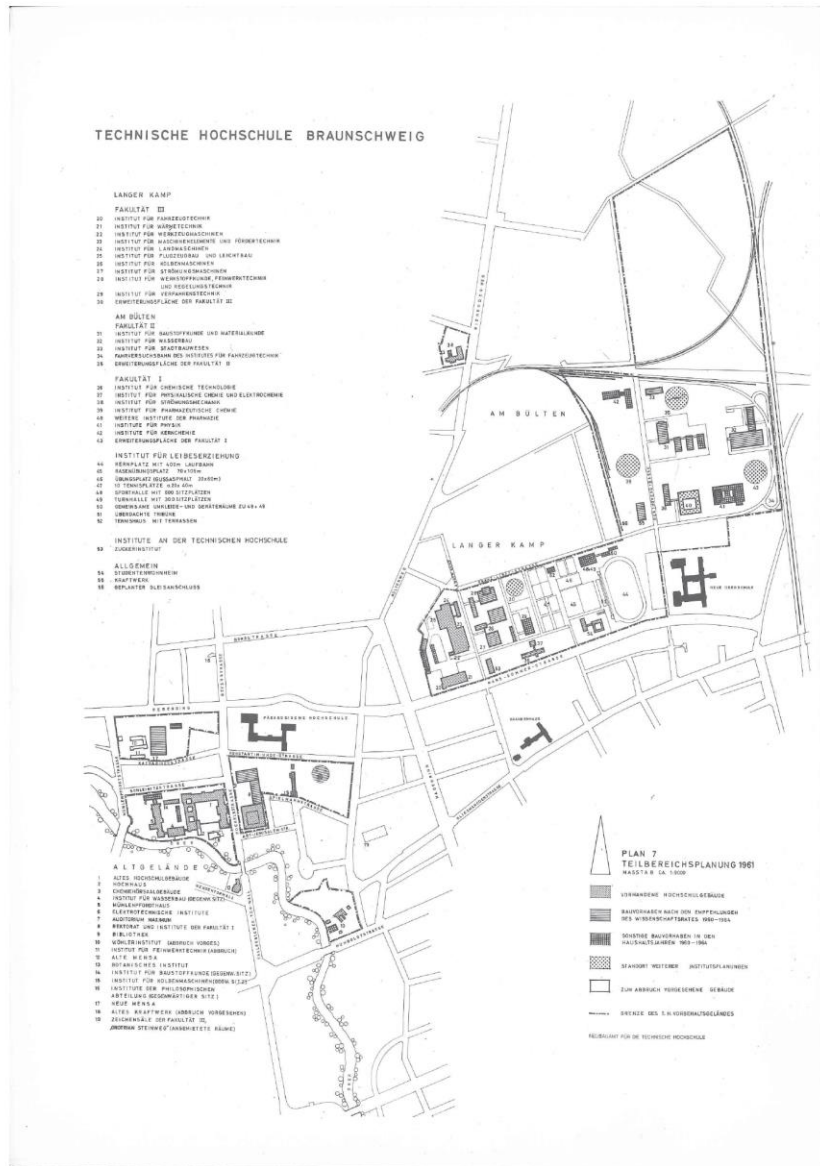
urban plans

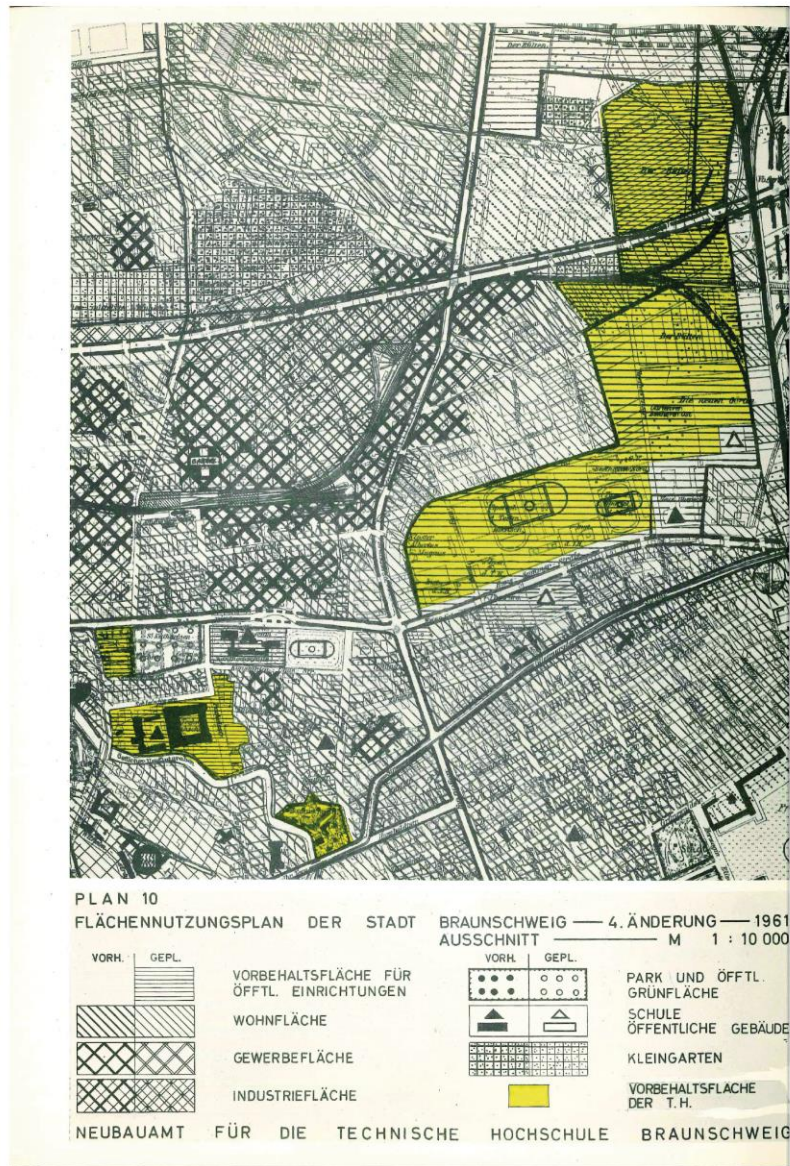
graphics

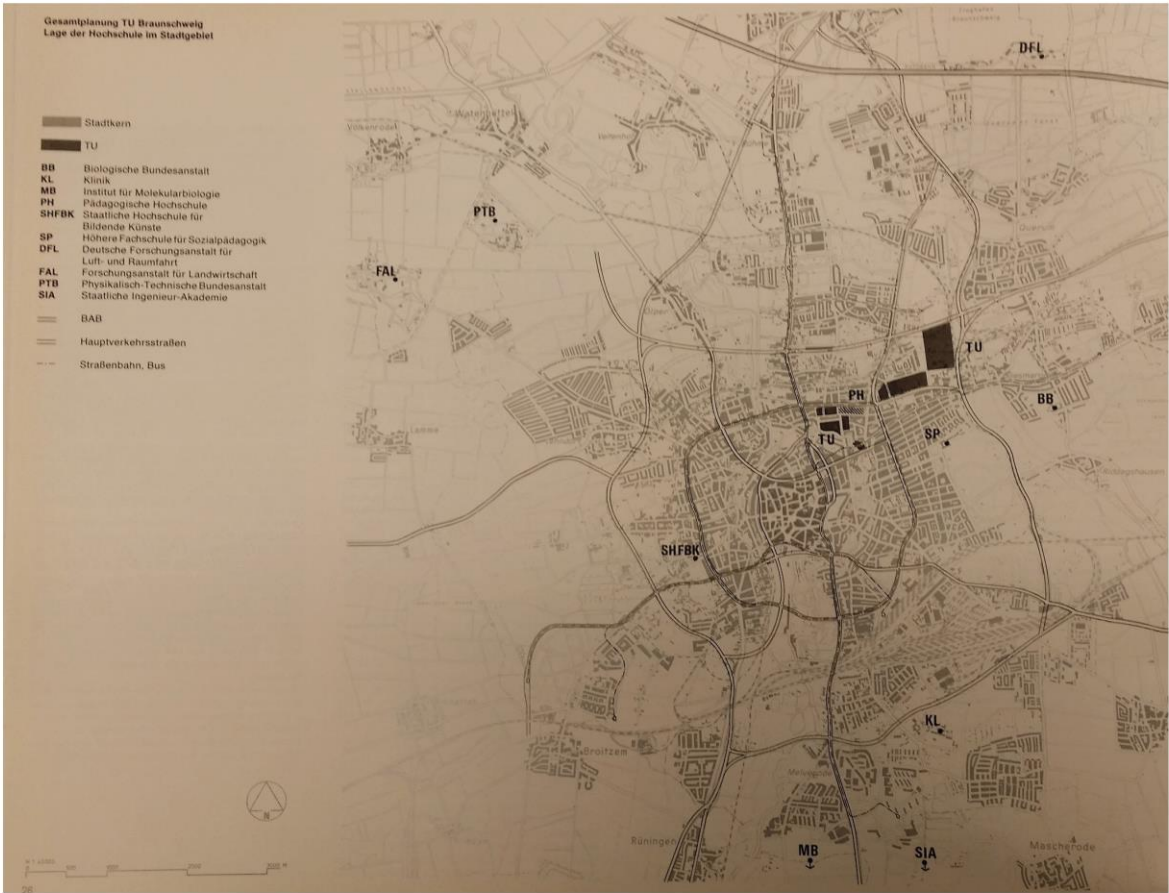
















## drawings analysis

### planning state of art before the project

First of all, for the University of Braunschweig and for the Institute of Piston Engines, should be considered as much the city Plan as the University Plan that are arranged consistently with each other. In particular, the Plan drawn up by the University following the Recommendations of the Scientific Council (in 1961), entails unavoidable changes to the City Plan.

- After the war (**1946**): urban plan drawn up by Göderitz

the city appears completely destroyed and the central University building (designed by Constantine Uhde in 1877) is gravely damaged. It is planned: the rebuilding of the central building and an arrangement of the technical Institutes in adjacent buildings.

- In **1947**: increase of the student's number. Idea of extending the University in areas external to the city

- In **1952**: the first land-use Plan (page. 16)

in the University area, distinction between the area belonging to the city centre and expansion area.

- **Between 1950 and 1959** the first Institutes are realized: indicated in the "planning of zones" of the University Plan, regarding the areas "Langer Kamp" and "Bülten", located east of the city and destined to the new University edification (page 17).

- Plan **1959**: differentiation, through different crosshatches, among the realized buildings, the ones in progress and the ones at the design stage.

- **Between the years 1957-1967**: the biggest expansion of the University takes place in the new areas.

- Plan **1961** (page 18)

It follows the Scientific Council Recommendations (advices given to all the Universities under construction after the war, in order to indicate the potential difficulties and the specifications for each Institute about dimensions and necessities). The Institute for Piston Engines is very different than in the previous Plan and much more similar to the realization, except for the garages building position in relation with the other buildings (in the Plan it isn't aligned with the laboratories). It belongs, in the legend, to the buildings realized after the Recommendations.

After three months the Municipality changes the land-use Plan on the basis of this one.

### Plan principles

- Realization of **complexes of buildings**, in order to save space and money.

- Buildings surrounded by the green

- Promotion of the use of prefabricated materials

- Attempt of giving a homogeneous image to the city and preservation of green spaces in the University areas.

- Flexibility for the technical university buildings subjected to future transformations and developments (see the plan at page 21 where the possible enlargements for all the new university buildings are represented).

For the Institutes oriented to physics and chemistry: requirement of 10% of extra surface from the project.

- Velocity: use of prefabricated materials favoured.

- Recommendations of the Scientific Council:

specific indications for some buildings

requirement of flexibility

strengthening of the administrative buildings

**restrictions and limitations**

- Economic limitations

- Planned area is under-sized

## sheet summary

from the graphics	what emerges	elements should be preserved
<b>composition</b>	<ul style="list-style-type: none"> <li>- physical and ideal connection among the buildings of the complex (alignment)</li> <li>- modularity, regular partition and symmetry</li> <li>- chimneys as part of the composition</li> </ul>	<ul style="list-style-type: none"> <li>- modularity of structure</li> <li>- complex composition</li> </ul>
<b>relationship between plan and elevation</b>	<ul style="list-style-type: none"> <li>- correspondence between plan and elevations partitions</li> <li>- correspondence between opposite facades</li> <li>- materials as part of the composition (structure on sight)</li> </ul>	<ul style="list-style-type: none"> <li>- materials of the structure</li> <li>- modularity of structure</li> <li>- complex composition (in plan and elevation)</li> </ul>
<b>comparison among the solutions</b>	<ul style="list-style-type: none"> <li>- chimneys (freestandings and not)</li> </ul>	
from the urban plans	what emerges	elements should be preserved
<b>planning state of art before the project</b>	<ul style="list-style-type: none"> <li>- interdependence between city and University Plans</li> <li>- University expansion outside the city borders</li> <li>- City Plan changes after the Scientific Council's Recommendations</li> </ul>	
<b>Plan principles</b>	<ul style="list-style-type: none"> <li>- complexes of buildings (multifunctional or double Institutes) scattering in the green</li> <li>- maximum flexibility for future changes</li> <li>- 10% extra surface for little changes</li> <li>- preference for prefabricated materials (in favour of velocity)</li> <li>- Scientific Council Recommendations</li> </ul>	<ul style="list-style-type: none"> <li>- building as part of the double Institute</li> <li>- modular structure as a device for a flexible building</li> </ul>
<b>restrictions and limitations</b>	<ul style="list-style-type: none"> <li>- economic limitations</li> </ul>	<ul style="list-style-type: none"> <li>- choice of traditional materials as consequence of the economic limits</li> </ul>



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**plans**

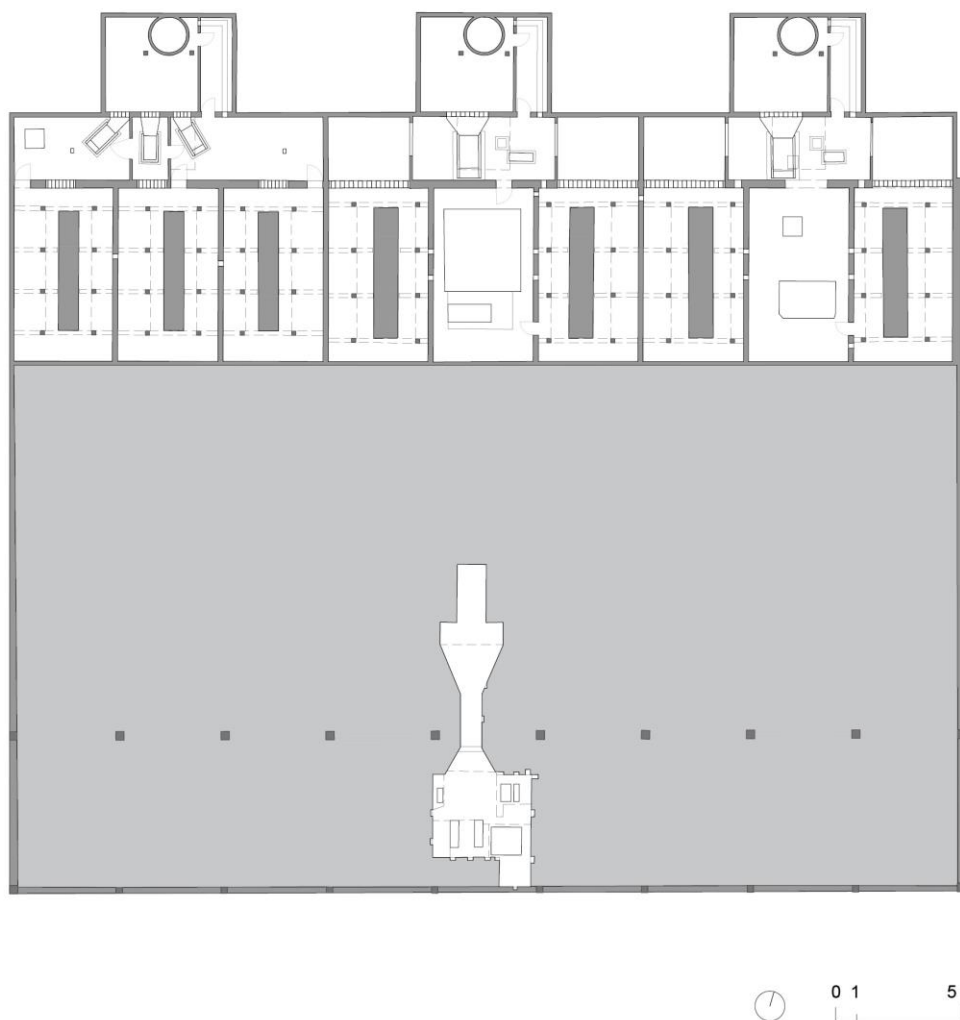
**site layout (till 2013)**



**site layout (2017)**



**basement**



Institute for Piston Engines

Braunschweig | 1960 | 1961-1965 | Walter Henn

plans

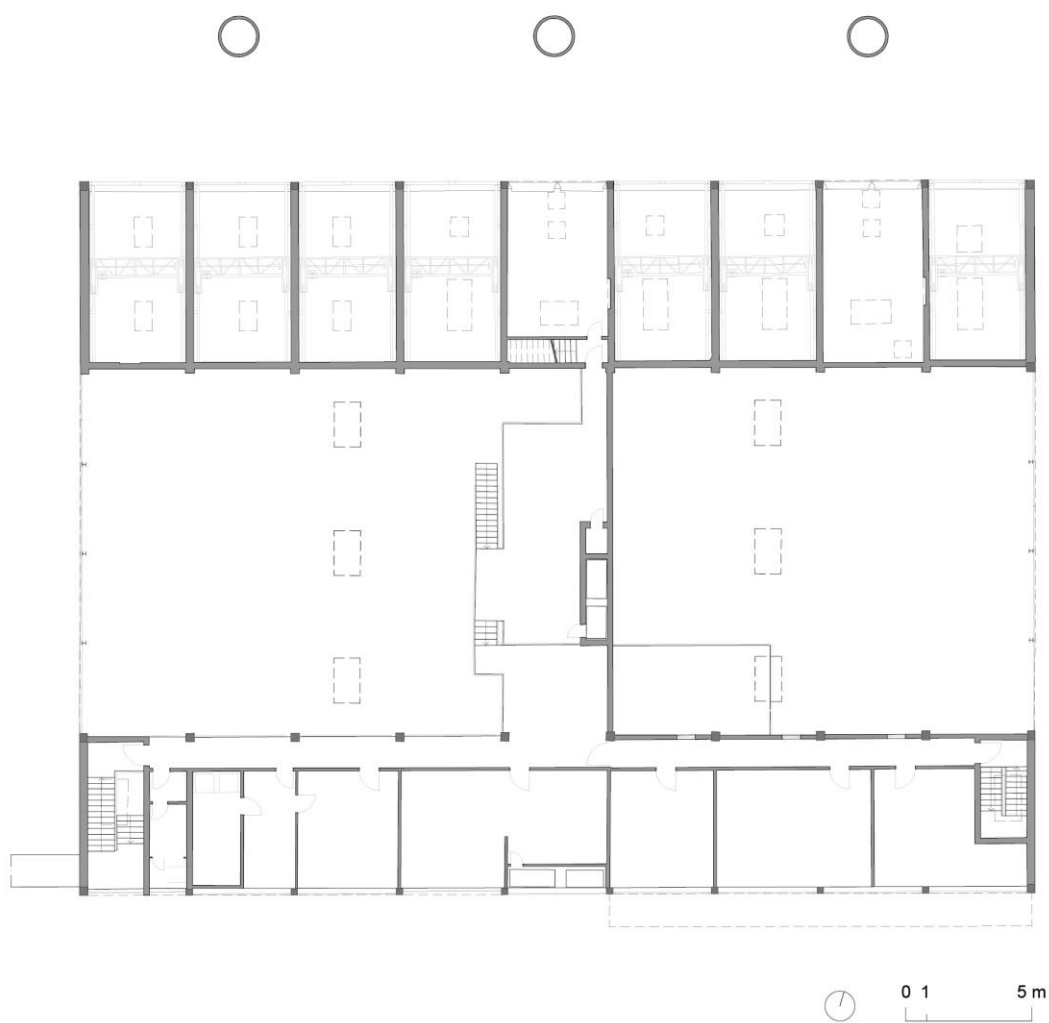
ground floor



Graphical investigation

5

**first floor**



**second floor**





## plans analysis

### planimetric composition

The building is **part of a complex** composed of three main buildings and a smaller one that are disposed **all around a not completely closed courtyard**. In the planimetric composition the buildings sides are aligned so that the not physically closed bounds of the courtyard are defined by the ideally traced alignment. The three main buildings are connected through aerial passages. **The composition of the buildings is very simple and regular**: they are all rectangular with a punctiform structure and a flat roof. In particular, the Institute for Piston Engines has a modular structure which can be ideally indefinitely repeated along the longest side. The **inner space is divided in three stripes** that are parallel to the longitudinal direction: the middle one is the largest. In the transversal direction the space is quite symmetrical and the symmetry axis is a tight stripe between two pillars in which different services, rooms and stairs are placed. On the north side of the Institute, **three chimneys** are placed: they are connected with the building opposite the basement level through hallways, symmetrically disposed along the longitudinal side (with the central one along the symmetry axis) and they are distant 5.95 m from the building.<sup>1</sup>

### function of spaces

By analysing the function, it emerges a **strong connection between function and spaces**. In particular, the three longitudinal stripes divide the space in three main functions: the southern side houses the tight strip of the offices, in the middle there is the largest strip which houses two big laboratories, the north tight strip houses the testing rooms system, which includes the basement, the ground floor, the first floor and the external chimneys. In this last strip the dependence of the space on the function is particularly evident: in fact, the basement and the first floor (opposite the testing rooms and the strip itself), together with the chimneys placed outside, are completely intended to house the ventilation system and the system for the disposal of the pollutant gases.

### evolution of spaces over time

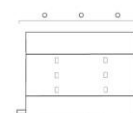
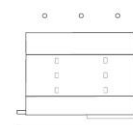
The spaces of the whole complex have been completely transformed in the recent intervention (starting from 2015). This transformation has led to a strong change in the composition both of the complex itself, and of the Institute for Piston Engines. In particular, the small garages building has been demolished, a new building (higher than the two laboratories and occupying a great part of the courtyard) has been realized meanwhile, in the Institute, the whole strip of the testing rooms and the chimneys have been demolished.

<sup>1</sup> Look also at the following sections in this graphical investigation.

Institute for Piston Engines

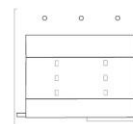
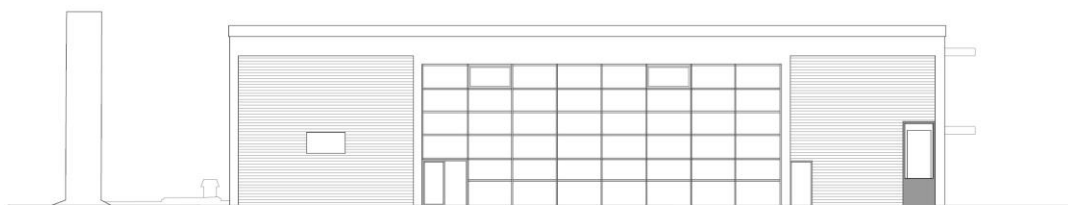
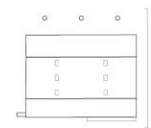
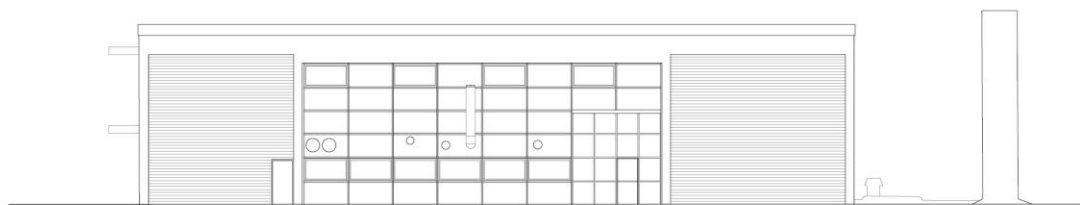
Braunschweig | 1960 | 1961-1965 | Walter Henn

**fronts**

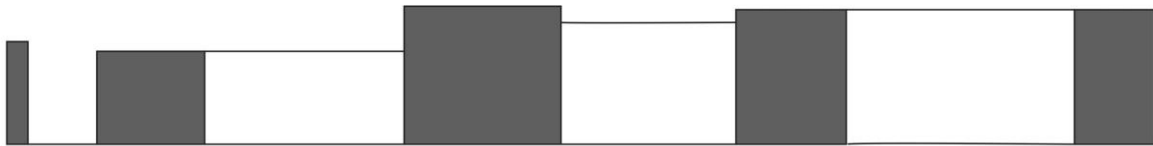


Graphical investigation

9



### fronts analysis



### composition

The building facades maintain the same composition structure as the plans showing outside the inner subdivision. In particular, the opposite fronts correspond with each other (the north with the south, the east with the west) and they have also correspondence with the inner division into portions: the longest facades are regularly subdivided from the structure into modular spans; the shorter facades are divided into three stripes (the same of the plan). The chimneys complete the front's composition and they are particularly characterizing the northern facade and the lateral ones.

### relationship between empty and filled

The facades show a real alternation between empty and filled that is visible not only with respect to the building, but also in all the complex facades (this is evident in the scheme on the top, in which there is the simplification of the west front of the whole complex). In this drawing also the chimneys play a key role concluding the alternation by representing the filled.

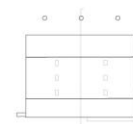
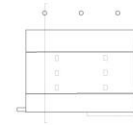
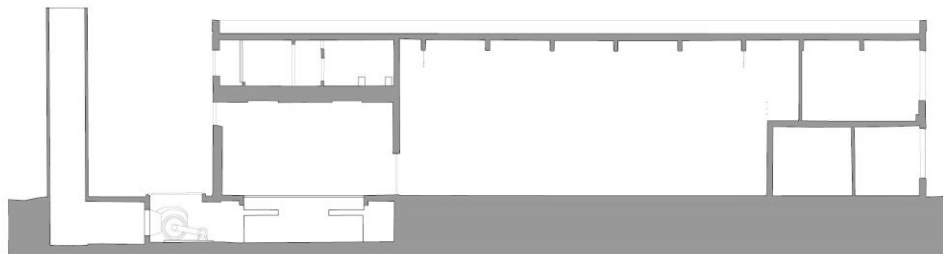
### materials

The laboratories of the complex, and the small garages building, are characterized by the use of three main materials in the facades: concrete (on sight) for the structure, bricks for the opaque walls and glass for the transparent ones. These materials play a double role: from the aesthetical point of view, they are functional to the composition of the facades allowing also the described alternation empty-filled; from the functional point of view, the presence of bricks (that are linked to the use of concrete) is due to their resistance and to their capacity to prevent, through a special wall, the noise from the interior.

### relationship with the plans

The facades show a complete coherence with the plans. In fact, outside the punctiform structure, the subdivision of the inner space in regular spans is made visible. It is shown the same alternation of stripes and each strip is distinguished by a different material.

**sections**



## sections analysis

### the spaces: their relation and perception

The building **looks like an industrial building** more than an university building because of: the large spaces housing its devices and machines that are put all over the building, the testing rooms (designed for testing the engines) and for its entire rooms destined just for housing the machines of the ventilation system. Moreover, the external chimneys give a strong perception of belonging to an industrial building. The north side, in particular, is completely intended for the test on engines so that the rooms are connected from the basement to the first floor and from the basement to the chimneys. The connection is functional to the passage of new pure air (from the first to the ground floor) and of polluted air (from the ground floor to the basement and then to the chimneys). In this sense, **the chimneys are an integral part of the building** both in terms of functionality and in terms of external perception.

### relationship among sections, plans and fronts

The coherence between plans and elevation also continues in section. The transverse subdivision of the space in three stripes and the modular partition in the longitudinal direction is still evident in the inner spaces. Moreover, in section also the connection among the rooms and the chimneys is evident, so that the dependence on them is highlighted.

## **general analysis**

### **spaces, elements and devices closely related to the intended use and to the typology**

spaces: all the spaces are linked and dependent on the function. Especially the rooms for the tests on machines and the rooms housing the devices and machines that are linked to them. It is important to consider also the external space, since it is made up of all the different buildings of the complex that are physically and geometrically connected with each other.

elements: the most characteristic elements are the chimneys: not only they are an external sign of the inner function, but they also are physically linked to the main function through the basement passages.

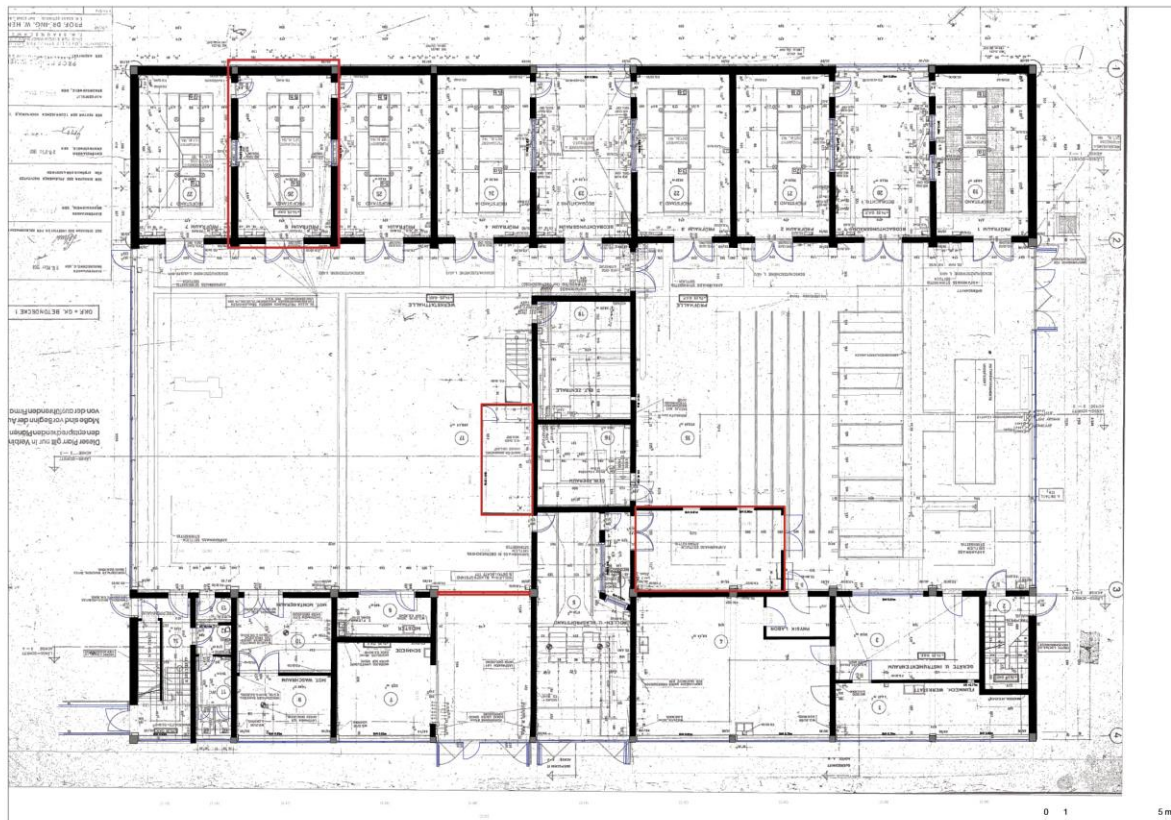
devices: a lot of devices and machines characterize the building, which looks like an "industrial machine". In particular, all the ones connected with the ventilation system.

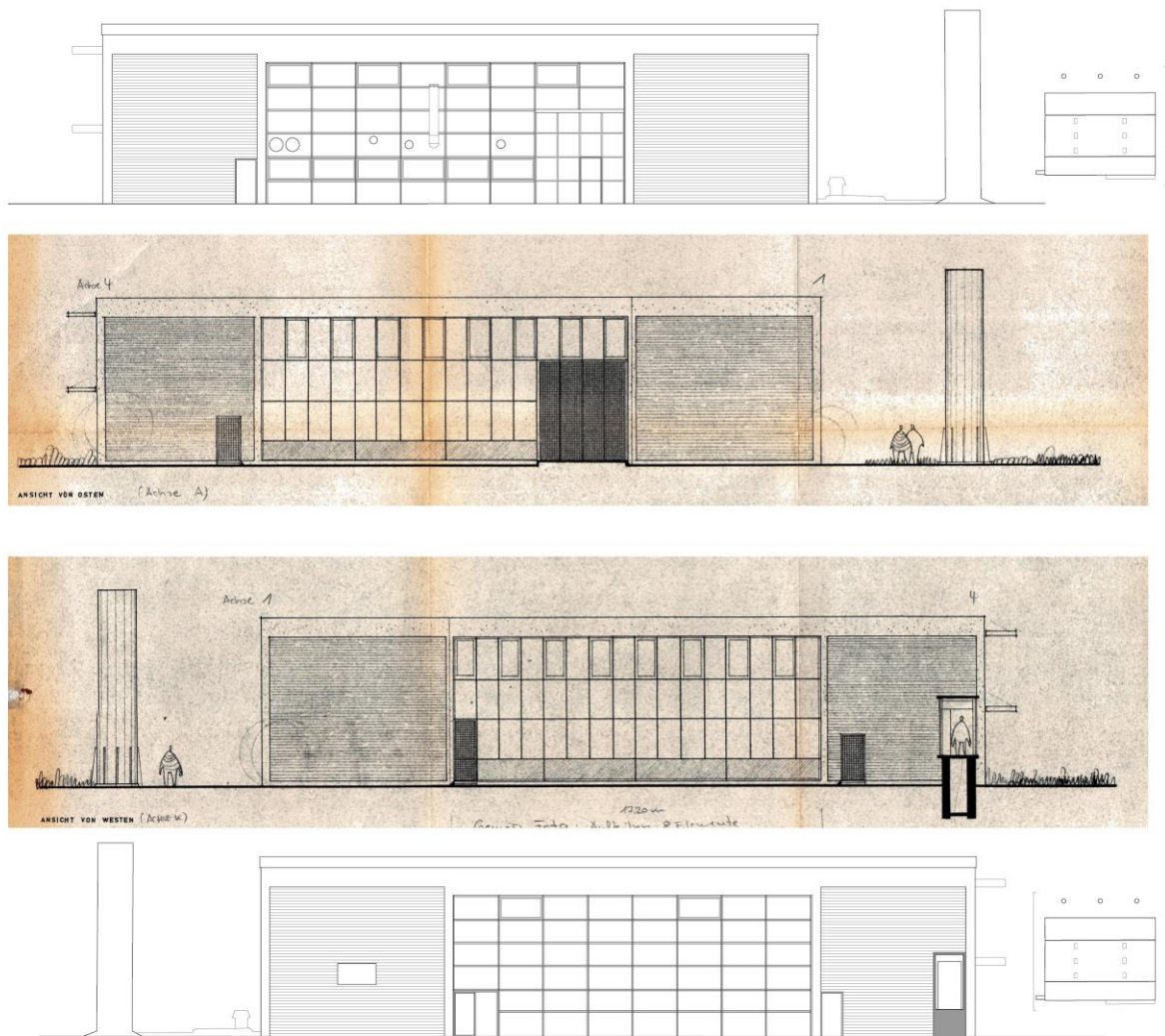


### **comparison between project and architectural survey**

Through the comparison among the drawings - concerning the original project and the architectural survey - the following modifications have emerged (see also the drawing in the next page):

- originally the tests rooms were seven while the observation rooms were two; then a tests rooms has been converted in an observation room.
- in the main halls, three volumes (service rooms) have been added, in addition to a wall in the entrance that defines a new room.
- in the project's drawings, the glasses in the eastern and western facades are represented in the vertical direction, while they have been realized following the horizontal direction.





Institute for Piston Engines

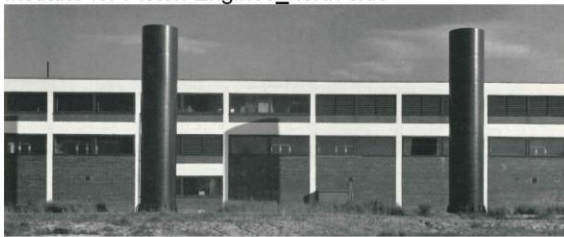
Braunschweig | 1960 | 1961-1965 | Walter Henn

architectural photographs

Institute for Piston Engines \_east side<sup>1</sup>



Institute for Piston Engines \_north side<sup>1</sup>

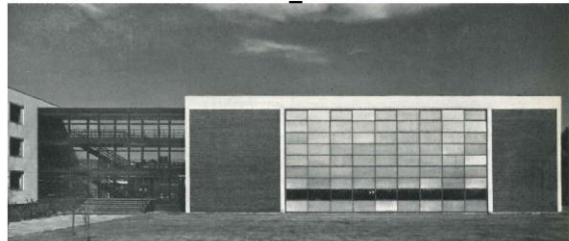


Institute for Piston Engines \_from northwest<sup>1</sup>



<sup>1</sup>from the journals <sup>2</sup>from [www.Henn.com](http://www.Henn.com)

Institute for Turbo Machines \_west side<sup>1</sup>



Institute for Turbo Machines \_from the courtyard<sup>2</sup>



Institute for Turbo Machines \_from southwest<sup>2</sup>



Graphical investigation

18



**Institute for Piston Engines**

Braunschweig | 1960 | 1961-1965 | Walter Henn

**present photographs**

Institute for Piston Engines\_2015<sup>1</sup>

west side



from northwest



from the courtyard



from northeast



<sup>1</sup>made by the ARGE Zentrum für Baukultur+Kommunikation & Institute for Building Documentation

Graphical investigation

19

**Institute for Piston Engines**

Braunschweig | 1960 | 1961-1965 | Walter Henn

**present photographs**

Institute for Piston Engines\_november 2017

west side



from northwest



from the courtyard



east side



Graphical investigation

20

**sheet summary**

from plans	what emerges	elements should be preserved
<b>main characteristics</b>	<ul style="list-style-type: none"> <li>- link with the other buildings of the complex, all disposed around a courtyard</li> <li>- ideal division of the inner space in three stripes in the longitudinal direction</li> <li>- structure modularity</li> <li>- link between internal organisation and function</li> <li>- chimneys as the external signal of the inner function</li> <li>- completely a new composition of the complex of buildings in the recent transformation</li> </ul>	<ul style="list-style-type: none"> <li>- planimetric composition of the whole complex</li> <li>- memory of the original function</li> </ul>
<b>fronts</b>		
<b>main characteristics</b>	<ul style="list-style-type: none"> <li>- alternation between solids and voids in the whole complex</li> <li>- concrete structure on sight</li> <li>- correspondence between the opposite facades of the building</li> <li>- correspondence between plans and fronts</li> </ul>	<ul style="list-style-type: none"> <li>- dependence among the buildings of the complex</li> <li>- the facades rhythm of the whole complex</li> <li>- chimneys</li> </ul>
<b>sections</b>		
<b>main characteristics</b>	<ul style="list-style-type: none"> <li>- perception of an industrial building</li> <li>- entire rooms in the second floor are destined to house just the ventilation system</li> <li>- testing rooms connected to the upper and below floors through the ventilation system</li> <li>- chimneys as an integral part of the building</li> </ul>	<ul style="list-style-type: none"> <li>- the chimneys: perception as an industrial building</li> <li>- inside connections among the rooms</li> </ul>
<b>spaces</b>		
<b>main characteristics</b>	<ul style="list-style-type: none"> <li>- strong relation between the spaces organisation and the function they house</li> <li>- the chimneys are the most representative elements</li> <li>- the building looks like a machine housing technical equipments</li> </ul>	<ul style="list-style-type: none"> <li>- the chimneys as representative elements and symbol of the building as a machine</li> </ul>



### Technical Investigation

materials and construction techniques

structural system

2

formal system

3

analysis of decay

types of decay

4

tests on materials

5

decay degree of severity

6

link between decay and causes of decay

7

comparison with other similar buildings made by Henn

8

graphical comparison

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**sheet summary**

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Technical investigation

1

**materials and construction techniques\_structural system**

structure	frame system with pillars and beams (distance between pillars 4,70 m, maximum span 17,10 m 19,5 m)
material of the structure	reinforced concrete (comparable to C25/30 or B300)
dimension of pillars	40x40 cm and 30x30 cm in the south side. Painted white on the facade
dimension of beams	30 cm
prevalent spans	4,67 m
slabs type	reinforced concrete
covering type	flat with skylights (beams, joists, ceiling panels)
number of floors	1 double height and 2 + 1 basement
floor's height	1,90 m (basement) 4,40-2,50 m (ground floor, testing room) 7,40 m (ground floor, at double height) - 3,80 m (first floor, offices)- 2,20 m (first floor, machinery system rooms)

**materials and construction techniques\_formal system**

vertical opaque closures	<b>south facade</b> (30 cm)	<b>east facade</b> (38,5 cm)	<b>north facade</b> (36,5 cm)	<b>west facade</b> (38,5 cm)
	plaster (1 cm)	plaster (1 cm)	plaster (1 cm)	plaster (1 cm)
	internal brick wall (20 cm)	concrete (17,5 cm)	concrete (20 cm)	concrete (17,5 cm)
	air gap (5 cm)	air gap (8,5 cm)	mortar (2 cm)	air gap (8,5 cm)
	brick cladding (klinker) (4,5 cm)	brick cladding (klinker) (11,5 cm)	brick cladding (klinker) (11,5 cm)	brick cladding (klinker) (11,5 cm)
	acoustic insulation (5 cm) in the testing rooms steel perforated plate in the testing rooms			
vertical transparent closures	steel fixtures, double thermolux and transparent glazing (8 and 12 mm), insulation			
installations	ventilation system (with many sound absorbers and air filters): the fans input the air in the testing rooms and expell the exhaust gases through three outside chimneys. The air admittance system is put on the upper level of the testing rooms, the air expelling system is put on the under level			
pavements	concrete floor			

analysis of decay

types of decay

involved area	type of decay	involved material
structure	vertical cracks	concrete
	horizontal cracks	
	hollows	
	crumble	
	carbonation	
	moisture in the covering	
	incrustation and mineral deposit	
	corrosion of reinforcing steel	steel
masonry	loosening of bricks	bricks
	mortar loss	
frames	cricks in the seals	rubber
	corrosion	steel

The tests made on the different parts and sides of the buildings conducted by the WISSBAU Ingenieurgesellschaft

**tests on materials**

involved area	under assessment	tests		results	
structure	quality of concrete	analysis on the boring	rebound hammer	strenght > minimum value	
			compression strenght tests	concrete comparable to C 25/30 or B300	
		ultrasonic measurements		velocity>minimum value <b>good quality of concrete</b> <b>homogeneity of concrete</b>	
	concrete cover	electro-magnetic measurement		inside	outside
				med. value>10 mm	med. value<10 mm
	carbonation depht	phenolphthalein solution test		pH>9,5	local pH <9,5
masonry	water absorption of bricks	Karsten test		- high capacity of water absorption - <b>discrete quality of masonry</b>	

## decay degree of severity

light severity ●  
 medium severity ●  
 high severity ●

area	type of decay									
	vertical cracks	horizontal cracks	hollows	crumble	carbonation <sup>1</sup>	corrosion of steel <sup>2</sup>	mortar loss	loosening of bricks	moisture	incrustat.
south facade	●	●	●	●	●	●	●	●		
east facade	●	●	●	●	●	●	●	●		
north facade	●	●	●	●	●	●	●	●		
west facade	●	●	●	●	●	●	●	●		
interior	●	●	●	●	●	●	●	●	●	●

<sup>1</sup>from phenolphthalein solution test

<sup>2</sup>from the inductive, electro-magnetic measurement (through the Würth BDM 1 instrument)

**link between decay and causes of decay**

**Types of causes:** are divided in

- planning (linked to decisions taken during the project)
- constructive (due to errors occurred during the realisation or in the implementation of the concrete mixture)
- material (due to the quality of materials)
- temporal (due to the natural decay of materials)
- maintaining (due to a lack of maintenance)
- functional (linked to the function housed in the building)
- local (linked to the geographical position and to the environmental conditions)

involved area	type of decay	probable causes	type of cause
structure	vertical cracks	atmospheric agents abrasive actions lack of maintenance	local temporal maintaining
	orizental cracks		
	hollows	constituent materials atmospheric agents	material local
	crumble	atmospheric agents	local
	carbonation	pH<9	temporal maintaining
	moisture in the covering	infiltration of water absence of insulation	constructive
	incrustation and mineral deposit	athmospheric agents pollution	local functional maintaining
	corrosion of reinforcing steel	carbonation abrasive actions	maintaining temporal
masonry	loosening of bricks	atmospheric agents lack of maintenance poor protection of varnish	local maintaining material
	mortar loss		
frames	cricks in the seals		
	corrosion		



**comparison with other similar buildings made by Henn****Siemens-Schuckert House of designers**

Mülheim/Ruhr

realization 1958-1960

project 1957-1958

Deutsche Bauzeitschrift 9/1966, B+W 5/1962,  
Zentralblatt für Industriebau 7/1965, 4/1966, 9/1966Buttolo, Susann; Lippert, Georg (eds.) 2012, p.176-179,  
291-292**state of preservation**the building is still used by the Siemens and it is in a  
good conservation status.In the external walls the windows have been replaced  
with new ones, but they occupy all the surface between  
the pillars so that the brick claddings exist no more.

structure	frame system with pillars and beams (distance between pillars 7 m, maximum span 56 m)
material of the structure	reinforced concrete
dimension of pillars	30x50 cm (30cm on side painted white)
dimension of beams	-
prevalent spans	7 m - 14 m
slabs type	reinforced concrete with insulated false ceiling 25 cm under the structure of every floor (because of the future conditioning system)
covering type	flat
number of floors	2 in the court sides and in the street side, 3 in all the other sides (1 on the basement)
floor's height	4 m (3 m floor-false ceiling)

vertical opaque closures	bricks (12 cm) covered by gray polycolor glass with an air space in between (2 cm), wood woll insulation (2,5 cm) inside; the sides facing the internal court in the longitudinal sides are covered with yellow little cilker bricks bands
vertical transparent closures	galvanized steel, double thermopan glass (for each module there are two big fixed windows and two small top opening windows)
installations	electrical rolling shutters (in the southwest and southeast sides), maschine for cleaning windows placed on the roof in all the sides, provision for a future air conditioning system
pavements	linoleum

**The social and factory building of the City****Factory**

Braunschweig

realization 1963-1964

project 1962

B+W 8/1965

Zentralblatt für Industriebau 9/1966

Deutsche Bauzeitschrift 4/1967-7/1974

Buttolo, Susann; Lippert, Georg (eds.) 2012, pp. 201-203, 294

**state of preservation**

the building is still used by for the current BS

Braunschweig Energy.

The external walls have been completely changed but  
the general original installation has remained even if  
extended.

structure	frame system on sight with white pillars and beams (distance between pillars 6,5 m, maximum span 6,5 m). Dimension of the building 19,5 x 32,5 m.
material of the structure	reinforced concrete
dimension of pillars	-
dimension of beams	-
prevalent spans	6,5 m
slabs type	Acoustic false-ceiling
covering type	reinforced concrete covered by aluminium slabs
number of floors	groundfloor + 4 above ground floors
floor's height	3,5 m (3,2 m light height)

vertical opaque closures	the north side is covered with klinker bricks. The parapet of the windows consists of opal elements. Acoustic walls
vertical transparent closures	frame in aluminium and wood. External sunbreaks (electrically-impelled light-metal blinds)
installations	air conditioning, thermal and electrical power station in the basement, electrical sunshades, system for cleaning windows
pavements	carpet or concrete. Acoustic slab

**The main warehouse of the City Factory**

Braunschweig

realization 1963-1964

project 1962

B+W 8/1965

Zentralblatt für Industriebau 9/1966

Deutsche Bauzeitschrift 4/1967-7/1974

Buttolo, Susann; Lippert, Georg (eds.) 2012, pp. 201-203, 294

**state of preservation**

the building is still used by for the current BS

Braunschweig Energy.

The external walls have been completely changed but  
the general original installation has remained even if  
extended.

structure	steel pillars IPE 200 (14 x 16 m grid); basis in reinforced concrete (belonging to a previous building)
material of the structure	steel
dimension of pillars	100-200 mm
dimension of beams	1 x 7 m
prevalent spans	14
slabs type	-
covering type	reticular beams covered by plastic-coated steel sheet. Skylight on the roof
number of floors	1 level
floor's height	8,60 m (6 m light height)

vertical opaque closures	plastic-coated steel sheet
vertical transparent closures	banding window in the walls and skylight on the roof
installations	supply of water, waste water, heating and electricity for all the city. Constant temperature inside of 15°C through extractor fans.
pavements	concrete

### Production building of the Aerzen Machine Factory

Aerzen  
realization 1962-1963  
project 1962  
Baumeister 11/1964  
Deutsche Bauzeitschrift 4/1967  
Zentralblatt für Industriebau 11/1966  
B+W 5/1964  
Buttolo, Susann; Lippert, Georg (eds.) 2012, p. 294

### state of preservation

the complex is subject to an expansion.

structure	(15 m grid); Dimension of the building 60 x 120 m.
material of the structure	steel
dimension of pillars	mm
dimension of beams	m
prevalent spans	15 m; maximum 60 m
slabs type	-
covering type	reticular Tie beams trusses 5 m distant each other, steel joints I140 2,5 m distant each other, roof slabs in aerated concrete (2,50 m x 0,50 m x 8,75 cm), a layer of bitumen lime painting, a layer of glass-fleece Robophon and two layers of cardboard. For each 15 m module there are 16 Polydet-light domes.
number of floors	1 level + gallery
floor's height	6 m light height



vertical opaque closures	north, east and sud sides are in klinker bricks; the west side is in Siporex aerated concrete blocks. The structure of the facades consist of a steel grid of vertical I240 and horizontal U200 (every 5 m); the steel is covered with polystyrene; the bricks are wire placed; In the inner side 5 cm of aerated concrete; 2 cm air bwtween brick and concrete (Ytong panels).
vertical transparent closures	band window at 1,35 from the floor, 1,50 m high made of fixed parts with Profilit glasses, of opening parts have a transparent glass filling (except for the west side)
installations	ventilation through electric controlled exhaust fans; brise-soleil in the south facade
pavements	Casalith beton floor (resistant to oil and acids, but not to water); layer of waxes protection

**Brunsviga maschine Factory**

Braunschweig

realization 1956-1957

project 1956

Baumeister 10/1957, Zentralblatt für Industriebau

2/1958, Deutsche Bauzeitschrift 9/1962

Henn, Walter<sup>a</sup> 1962, pp.176-177

Buttolo, Susann; Lippert, Georg (eds.) 2012, pp. 154-157, 290

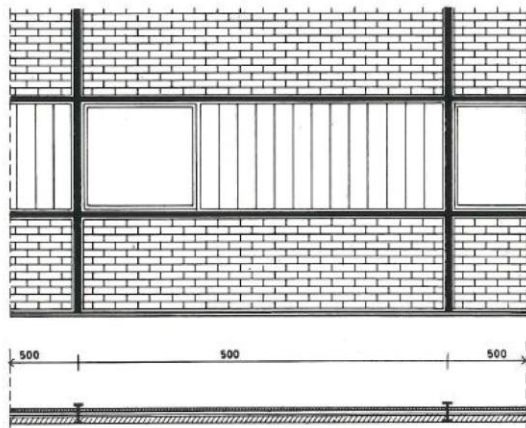
**state of preservation**

the complex is a school and it is well preserved.  
It is necessary to control if the electrical heating in the  
wardrobe building is still present

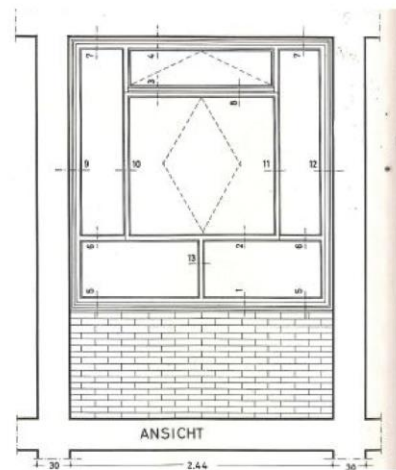
structure	production building and connections (45,5 x 13,9 m): reinforced concrete frame on sight and a central line of bigger pillars wardrobe building: the same foundations of a previous building; combination of reinforced concrete frame and masonry walls
material of the structure	reinforced concrete
dimension of pillars	production building: central pillar (60 cm in the ground floor, 50 cm in the first and second floors, 40 cm the last floor); external pillars of 30 cm
dimension of beams	production building: 30 cm
prevalent spans	production building: 6,4 m
slabs type	reinforced concrete
covering type	production building: massive concrete (11 cm), plates of pressed asphalt (3 cm) in which are stripes of compressed air (2,5 cm); 5% incline along the beam. wardrobe building: massive concrete
number of floors	production building: 4 floors wardrobe building: 2 floors
floor's height	production building: different heights, because of the old linked building (minimum 3,78 m, maximum 4,13 m)

vertical opaque closures	production building: parapets (double row of pot bricks, external covering with yellow clinker) wardrobe building:
vertical transparent closures	production building: steel frames (sky blues and black in contact with the structure), 4 fixed parts, 2 opening parts; the glasses are DD and cathedral glasses in groundfloor wardrobe building: steel frames, fixed and opening. In concrete prefabricated components in the restrooms.
installations	Drainage electrically controlled (connections housed in cavities of columns) in wardrobe building: heated gutters and drainpipes (heating cables developed by the Siemens-Schuckert Factory, plastic membrane,
pavements	linoleum and concrete

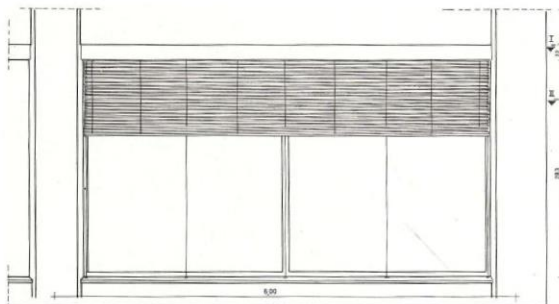
graphical comparison



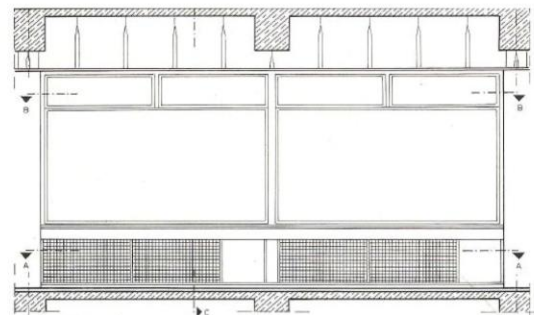
Aerzen Machine Factory\_Braunschweig



Brunsviga Machine Factory\_Braunschweig



Machine Factory\_Munich



Siemens-Schuckert House of designers\_Mülheim/Ruhr

**sheet summary**

from the analysis of decay	what emerges		elements should be preserved
types of decay	<ul style="list-style-type: none"> <li>- vertical and horizontal cracks</li> <li>- hollows</li> <li>- crumbles</li> <li>- carbonation</li> <li>- moisture in the covering</li> <li>- mineral deposit</li> <li>- corrosion of the reinforced steel</li> <li>- loosening of bricks</li> <li>- mortar loss</li> </ul>		
decay degree of severity	effect of the exposure in the decay progress		
from tests on materials			
quality of materials	<ul style="list-style-type: none"> <li>- effect of the exposure in the decay progress</li> <li>- good quality and homogeneity of concrete</li> <li>- good quality of bricks</li> <li>- not so good conservation status of structures (better inside, worst outside)</li> </ul>		bricks and structure with the necessary intervention of maintenance, restoration and refurbishment
link between decay and causes of decay	<ul style="list-style-type: none"> <li>- lack of maintenance</li> <li>- geographical conditions</li> </ul>	play a key role	
	<ul style="list-style-type: none"> <li>- constructive errors</li> <li>- low quality of materials</li> <li>- planning errors/ deliberate choices</li> </ul>	are not present	
comparison with other similar buildings made by Henn	variety of solutions		

## **The Italian sheets work**

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**publications concerning the designer**

Nuovi edifici alla Università di Perugia. La nuova casa dello studente, in: *Domus*, 28., 1955, 309, pp. 8-9.

Gorio, Federico: L'Aula Magna dell'Università di Perugia di Giuseppe Nicolosi, in: *Casabella Continuità*, XXXI, 220, 1958, pp. 15-21.

Mandolesi, Enrico: L'Aula Magna dell'Università di Perugia, in: *Costruire*, I., 2, 1959, pp. 30-39.

Ivani, Enrico: L'Accademia anatomico-patologica di Perugia, in: *Costruire*, 21., 1979, 113, pp. 1-4.

Gorio, Federico (eds.): Giuseppe Nicolosi: figura, opere e contesto. Monographic issue of "Rassegna di Architettura e Urbanistica", XXXVI, 106/107/108 2002.

Rebora, Michele: Architetture di Giuseppe Nicolosi per i centri storici.1950/65, in: *Rassegna di Architettura e Urbanistica*, 55, 1983.

Belardi, Paolo: Il valore del dettaglio: architetture ombre di Giuseppe Nicolosi, in: *l'Università*, 4, 1987

Belardi, Paolo: La necessità della libertà espressiva. Architetture ombre di Giuseppe Nicolosi, in: Belardi, Paolo: *Il rilievo insolito, irrilevante, irrilevato*. Quattroemme, Perugia 2002, pp. 215-225.

Argenti, Maria: Architettura, modernità e tradizione nell'opera di Giuseppe Nicolosi, in: Remiddi, Gaia: *Studi sul moderno romano*. Palombi Editore, Rome 2005, pp. 63-66.

Belardi, Paolo (eds.): Giuseppe Nicolosi (1901-1981). Architettura Università Città. Conference Acts (19 October 2006). Libria, Melfi 2008

Arcangeli, Luca (eds.): Giuseppe Nicolosi. Scritti 1931-1976. Casa dell'Architettura, Rome 2013

**coeval buildings belonging to the designer**

**University Great Hall and Library**

Perugia

Realization 1957

Project 1950-1957

Belardi, Paolo (eds.) 2008, pp. 165-179

Gorio, Federico 1958, pp. 15-21.

Mandolesi, Enrico 1959, pp. 30-39.



**Keyword: function, aesthetics, representativeness**

The building is located in Perugia historical centre, next to Rectory (a former Convent). The area is steeply sloping: for this reason the Library acts as a base for the Great Hall and it is decomposed in ramps and staircases in order to deal with the height differences; the Great Hall lies in this way on an horizontal plane and it symbolizes a place of representation together with the Rectory (they are connected through a gangway and, ideally, the inner space of the Great Hall is in axis with the main cloister and the Rectory centre. The main characterisation is given by the wall weaving, with a specifically created geometric drawing and that acts both as cladding and as acoustic absorption system. It appears as a three-dimensional bugnato. The plan is obtained by the intersection between a rectangular and a rhomboid and it is divided in spans. The longitudinal facades are identical and they have big openings with diamond lintels at the bottom, embrasures above the lintels and thin horizontal windows on the top. The short facades are much more massive, contrary to the Library underlying facades, completely glazed.

**Faculty of Math, Physical and Natural Sciences**

Perugia

Realization 1964

Project 1959-1961

Belardi, Paolo (eds.) 2008, pp. 181-192



Bibliographical investigation

**Keyword: University open to the city**

The building is placed in a very difficult context, in the Perugia historical centre, next to the University Church and Rectory. It has been developed starting from a previous building and an historical wall, which didn't allow the passage to a higher city area. The space becomes permeable, both through horizontal and vertical connections; the building composition is complex, organized on three levels, with the basement that is public and walkable through an arcade which gives access to a monumental staircase. The structure is in concrete and, as usually in the Nicolosi's architecture, the walls are characterized by a specifically created bricks texture.

## Anatomical-Surgical Academy

Perugia | 1981 | 1971-1975 | Giuseppe Nicolosi

## Students House

Perugia

Realization 1959

Project 1955-1956

Belardi, Paolo (eds.) 2008, pp. 193-201



### ***Keyword: University open to the city***

This building is placed in a steeply sloping area in the historical centre of Perugia (7 meters of difference of height). Nicolosi uses a basement of two floors in order to overcome the difference and to have a horizontal plane for the building. The building is constituted by two rectangular buildings, rotated each other. The rooms are arranged on the external sides and they are served by a central hallway starting from the staircase and the lift shaft and reaching the collective bathrooms at the extremities. The structure is punctiform, in concrete and modular so that for each frame (4 meters) there are two rooms and they are completely symmetrical.

Bibliographical investigation

5

**Chemistry Department, Nature and Biological Institutes**

Perugia

Realization 1961-1968

Project 1959-1961

Belardi (eds.), 2008, pp. 203-214



**Keyword: History as the “basement” of the New**

This building project is based on the historical context in which it is grounded. At the edge of the Perugia historical centre, an ancient collapsed church and a Roman mosaic, which has been never safe guarded, become the cornerstones of a new University building, realized with a concrete on-sight structure, bricks and glasses for big openings. The Mosaic can be seen from the outside, through a 30 meters opening, and inside since the space around it becomes a public passage and linkage of all the vertical connections. The former church becomes a meeting room which houses the pillows holding the 5 higher floors.

## comparison with the investigated building

### similarities:

- Nicolosi deals mostly with university buildings. In particular in Perugia he realizes, even if in different years, a homogeneous urban intervention in the historical centre giving life to a campus in the city.
- Nicolosi pays attention to the historical context and he is respectful of the historical buildings. For his new realizations: he uses materials able to pair with the ancient medieval stones (in particular the bricks, that are used with an aesthetic component too); but, at the same time, he denounces the new architectures through their composition, their relation with the pre-existing buildings and with the concrete structure on sight; the facades have compact walls that are pierced by irregular different openings; the composition of plans and facades dialog with the context and they fragment, open themselves to the city establishing new public spaces. In fact Nicolosi's projects (in particular for the University of Perugia) are urban projects: through their architectures he improves the accessibility and the perception of the historical centre, and he establishes new connections.
- Nicolosi takes advantages of the steep terrain shaping and transforming it in favour of the architecture. The slope facilitates the sense of monumentality for some buildings (like the Great Hall and the Academy itself) and it allows to have wonderful views on the landscape and, in this way, a visual contact with the city.
- All the Nicolosi's buildings are characterized by the use of concrete, for the structure, and of brick for the claddings. The concrete, for some elements (like the beams, lintels or the shelves of the balconies that have a specific shape) is on sight and it contributes to the composition of the facades. The bricks not only are cladding, but they have also other functions: an acoustic role, they allow to build a double wall which is better for the thermal insulation and they are an aesthetic element since they are composed, specifically for each building, in order to create a brick texture.

### differences:

- The Anatomical-Surgical Academy is placed at the edge of the historic city centre where there are no remains. For this project Nicolosi has not to solve the relationship with other historical buildings.
- Nicolosi, with the Anatomical-Surgical Academy, shows an ironic attitude because he establishes some free allusions through the external shape, going beyond the direct link between form and function: in fact he titles the building "the Ark of the Science"
- The Anatomical-Surgical Academy can be compared with the Great Hall in terms of image of monumentality and representativeness they transmit: both of them stand out in the city skyline, while the other university buildings harmonize with the urban fabric.

## publications of the designer

Nicolosi, Giuseppe: Alcuni aspetti concernenti le costruzioni scolastiche in Germania. Milan 1931.

Nicolosi, Giuseppe: Piano regolatore generale e piani regolatori particolareggiati. I vincoli della Proprietà edilizia, in : Concessioni e costruzioni, 3., 1932, 8, pp. 515-523.

Nicolosi, Giuseppe: Studio per un piano regolatore di ampliamento di Littoria, in: L'ingegnere. Rivista tecnica e sindacale del Sindacato Nazionale Fascista Ingegneri, 8., 1934, 12, pp. 608-612.

Nicolosi, Giuseppe: La standardizzazione nell'abitazione collettiva. Organizzazione industriale del cantiere edile, in: Acts of XIII International Congress of architects (Rome, 22-28 September 1935). Rome, 1936.

Nicolosi, Giuseppe: Caratteri permanenti nelle architetture italiane, in: Augustea. Rivista imperiale del nostro tempo, 15., 1940, 19-20, pp. 9-12.

Nicolosi, Giuseppe: L'edilizia popolare e l'urbanistica moderna. Rome 1941.

Nicolosi, Giuseppe: Estetica e storiografia dell'architettura, in: Rassegna critica di Architettura, 8., 1950, 15, pp. 3-19.

Nicolosi, Giuseppe<sup>A</sup>: Formazione dell'architetto. Pontificia Università Gregoriana, Rome 1953.

Nicolosi, Giuseppe<sup>B</sup>: Ingegneria e architettura. Trieste 1953

Nicolosi, Giuseppe: Architettura e Urbanistica. Edizioni Radio Italiana, Turin 1958

Nicolosi, Giuseppe: Il laterizio nell'architettura, in: Il laterizio nella costruzione. Proceedings of the V National Conference ANDIL (Rapallo, 28-30 May 1959), Rome 1960, pp. 149-168.

Nicolosi, Giuseppe : Nuove tecniche e materiali. Loro influenza sull'architettura, report presented to the VI International Union of Architects Conference. London, Juli 1961

Nicolosi, Giuseppe: L'insegnamento dell'architettura, in: ingg-arch-i, rivista tecnica ingegneri e architetti d'Italia, I., 1962

Nicolosi, Giuseppe: La formazione dell'architetto, in: Rassegna dell'Istituto di Architettura e Urbanistica, I., 1965, 2, pp. 7-18.

Nicolosi, Giuseppe<sup>A</sup>: L'opera dell'Università degli Studi di Perugia sui centri storici dell'Umbria. Report presented to the National Study Conference of the ANCSA, Perugia, May 1966.

Nicolosi, Giuseppe<sup>B</sup>: Posizioni ed esperienze sulla questione dei centri storici, in: Rassegna dell'Istituto di Architettura e Urbanistica, 4, 1966.

Nicolosi, Giuseppe<sup>C</sup>: L'architettura nel mondo di domani, in: Rassegna dell'Istituto di Architettura e Urbanistica, 2., 1966, 5, pp.7-19.

Nicolosi, Giuseppe: Analisi delle tendenze individuabili nel "contesto" in relazione alle caratteristiche delle localizzazioni industriali nel Mezzogiorno, in: Rassegna dell'Istituto di Architettura e Urbanistica, 8., 1972, 24, pp.71-77.

Nicolosi, Giuseppe: Creatività e tecnologia, in: Rassegna dell'Istituto di Architettura e Urbanistica, 9., 1973, 26/27, pp. 7-20.



## definition of the designer thinking

### what and who influences the definition of his way of thinking and on which issues

- the historical context.

Nicolosi takes part to the Modern Movement independently and by opposing some principles. He creates his own language and he doesn't want to belong to any movement. His oppositions are towards the excess of individualism of the modern architects and towards the absence of community in the modern architecture; instead he is in favour of an architecture which shares its purposes with the community and he prefers the organic buildings against the idea of "a building like a machine". In particular he is in contrast with the extreme simplification of the reality and the standardisation.

- his masters: Gustavo Giovannoni and Arnaldo Foschini.

from Giovannoni: the careful analysis of a place before a project

from Foschini: accuracy and abstraction of shapes.

- the coeval architects and architectures.

Like Saverio Muratori and Ernesto Nathan Rogers, Nicolosi doesn't create isolated architectures, but architectures in close contact with the city. He believes also in the importance of the urban plans so that he develops a lot of them for many cities during his profession.

Nicolosi has numerous exchanges of views at distance with the architect Mario Ridolfi, with whom he shares his stylish expressiveness and the great care put on the details of each project.

- the Scandinavian Empirism.

This influence is visible in the use of materials (concrete and bricks together), in the desire to humanise the too severe Rationalism positions. In particular the Swede Erik Gunnar Asplund influences Nicolosi in the way to deal with the relationships between new and existing buildings (in particular they share the ability to make recognisable the new interventions although they harmonize with the pre-existing buildings) and through all his architecture that is organic and rationalist at the same time.

- the Urban planning.

He participates in many competitions for the towns planning. These experiences have a great repercussion to his following architecture after the Second World War.

### style

In the first experiences: linked to tradition;

in 1930s: he is part of the RAMI (the Young Italian Architects Grouping) in the field of the Rationalism.

in 1950s: he distanced from the Rationalism. He started defining his personal language in architecture.

Refusal of the industrial rationality, conservation of the artisanal dimension, importance of the minor architecture as testimony of the past culture so that the new intervention are a simple extension of the existing. Virtuosity of the

form, where the form is connected to the function and to the structure: a project develops starting from the designer's personality (the feeling at the base of any project); the function and the construction allow to control and direct this feeling making it the shape. In this sense, the three Vitruvian components are not as equals, but in such a relation whereby utilitas and firmitas reach their synthesis only through venustas.

- architecture types he deals with.

Popular residences: he takes part to the Social Housing Institute and collaborates with the INA Casa Institute

Churches: characterized by austerity and simplicity. Through the Churches realization he defines his personal architectural language.

#### **the principles for what is he known and stands out**

- way of working: precision, accuracy, methodological coherence, study of details, attention to the observance of the project during the realization, reception of the suggestions both coming from the colleagues and from the workers.

- characteristics: texture of bricks. The use of bricks in the facades as cladding is taken up by the post-war Nordic architectures; but for Nicolosi bricks aren't just cladding; they also represent symbolically a recall to the ancient architectures (used by him as a constant reference) and an analogy with the not ended facades of the medieval churches while, from the technical point of view, they have an acoustic function; the texture assumes also the ornamental and chromatic function. Nicolosi starts the work for experimenting the creation of an expressive motif through a particular use of the bricks on the walls surfaces, and for making corporeal the geometric plane, from the Guidonia Palace (in the 1930s) and he continues for the whole career.

- the spaces created in the main laic buildings (like the Great Hall and the Anatomical-Surgical Academy) are an archetype of the ecclesiastical space, which represents the public space par excellence (so that these laic buildings space are comparable to the different churches that he has designed).

#### **important sentences based on his written**

*"l'individualità in architettura appare inadeguata di fronte agli attuali e complessi contenuti umani e tecnici, ed alla necessità di acquisirli perché l'architettura possa redimersi dall'astratto formalismo e attraverso la verità umana, avviarsi verso un'autenticità estetica".*

*Individuality in architecture appears inadequate confronted with the current and complex human and technical contents and with the need to acquire them in order to redeem the architecture from the abstract formalism and, through the human truth, or move towards the aesthetic authenticity.*

(Nicolosi, Giuseppe: L'insegnamento dell'architettura, in: ingg-arch-i, rivista tecnica ingegneri e architetti d'Italia, I., 1962, p. 253)

*"L'insegnamento che tutti noi architetti potremmo trarre dalla genuinità dell'architettura minore, che nasce dall'utilità e dalla spontaneità, è appunto questo: che attenuando i nostri schemi formali precostituiti, la nostra personalità, lungi*

*dallo scomparire, risorgerebbe - in ogni problema umano risolto - sempre la stessa e pur sempre ricreata, ringiovanita dalla piena aderenza alla vita."*

*The teaching that all of us architects could deduce from the genuineness of the minor architecture, which arises from utility and spontaneity, is precisely this: by attenuating our pre-established formal schemes, our personality, far from disappearing, would resurrect - in every human solved problem - being always the same but still recreated, made younger by the full adherence to the life.*

(Nicolosi, Giuseppe: *Architettura e Urbanistica*. Radio Italiana Editions, Turin 1958, p. 130)

*"Architettura e urbanistica sono lo studio dell'ambiente della vita umana; ambiente che impegna chi lo costruisce a secondare e provocare il processo di miglioramento della vita: ambiente nel quale la civiltà rivela il suo livello in un valore che si chiama bellezza".*

*Architecture and city planning represent the study of the human life environment; environment which requires its creator to support and elicit the process of improving the lives: environment where the civilization shows its level through a value which is called beauty"*

(Purini, Franco: *un valore che si chiama bellezza*, in: Belardi, Paolo (eds.) 2008, p. 21)

**publications concerning the building**

Annuario dell'Università degli Studi di Perugia a.a. 1963/'64, Perugia 1963

Annuario dell'Università degli Studi di Perugia a.a. 1964/'65, Perugia 1964

Annuario dell'Università degli Studi di Perugia a.a. 1967/'68, Perugia 1967

Belardi, Paolo: La necessità della libertà espressiva. Architetture umbre di Giuseppe Nicolosi, in: Belardi, Paolo: Il rilievo insolito, irrilevante, irrilevato. Perugia 2002, pp. 215-225

Dozza, Giancarlo: Università di Perugia. Sette secoli di modernità 1308-1976. Perugia 1991.

Gori, Riccardo: Rilievo architettonico dell'Accademia Anatomico-Chirurgica di Giuseppe Nicolosi. Dissertation (A.y 2005/2006. Supervisor: prof. Paolo Belardi; assistant supervisor: Valeria Menchetelli). University of Perugia.

Menchetelli Valeria: L'Accademia Anatomico-Chirurgica, in: Belardi, Paolo (eds.): Giuseppe Nicolosi (1901-1981) – Architettura Università Città, Conference proceedings (Perugia, 19 October 2006). Libria, Perugia 2008, pp.229-242.

## description of the building

The Anatomical -Surgical Academy has been designed from 1971 to 1974 and realized from 1974 to 1975, even if the official conclusion occurs in 1981. It has been operative till 2013, when the inner functions have been transferred to the new Faculty of Medicine and Surgery on the outskirts of Perugia. The Academy is located at the edge of the historical centre, in a then new area which should house an extension of the Faculty of Medicine (which was not too far from there, in the Montelucente district); in fact, during the development of the project, two new buildings were being realized there. The building housed several university functions: the Central Library, the Presidency, technical rooms, a reading room, a Great Hall and the location of the Anatomical Surgical Academy. Three different variations of the project are known, thanks to the numerous drawings left by Nicolosi himself. The first one dates from 1971: the first external siding chosen by Nicolosi was the stone, for all the facades; together with a solemn portal in travertine, the image of the building was very severe and austere: the entry was upstream, at the Hall level, through a double flight of stairs in order to overcome the difference given by the levelling of the site; there wasn't a view in the Hall. The second version belongs to 1973: the main entry was downstream, at the Library level, while upstream there was a direct entry to the Hall occurring through a gangway, instead of the flight of stairs; there is no a levelling of the terrain; a gallery, with a view on the Hall, appears, but it is not open but glazed. The final version was made between 1973 and 1974 and there are very important variations: the external siding consists no more of stones but of bricks; the main entrance is the one downstream, but other secondary entrances are put upstream and on the west side; important is the superelevation of the roof in order to build the characterizing false ceiling of the Hall; the gallery is open on the Hall. The final project has been followed, for the structural part, by the Engineer Franco Checcarelli. Since the realization took place in the 1970s, the building meets the requirements of seismic vulnerability just for the 34% and, for further uses, it is in needs of some intervention in order to improve its seismic performance. Nevertheless, the building is not damaged except for the false ceiling of the Great Hall. This project is one of the last Nicolosi's projects and one of the last for the Perugia University intervention. It holds a synthesis of his researches and it represents a sort of legacy of his work. For this reason the building has many characteristics in common with the previous ones, in particular with the buildings realized in the urbanistic intervention for the University of Perugia. Coherently with the Nicolosi style, the building has a concrete structure, with a bricks cladding. Some curved walls are also masonry (structure). The presence of organic spaces and of curved walls characterizes this building. In particular in the Great Hall, the main space, curved lines are both in the walls and in the false ceiling. The inside and the outside suggest a ship shade: Nicolosi, in fact, attributes to the building the symbol of the "Ark of the Science".

**publications concerning the same typology**

van Eyck, Aldo: University college in Urbino by Giancarlo De Carlo. Zodiac, Milan 1966

Carbonara, Pasquale: Architettura pratica. Gli edifici per l'istruzione e la cultura, vol. 3, tome II. Turin 1976

De Carlo, Giancarlo; Nicolini, Pierluigi: Urbino, in: Lotus International, 18, 1978

Rebecchini, Marcello: Progettare l'Università. Le analisi preliminari e le scelte progettuali di fondo. Kappa, Roma 1981

Ferrari, Mario: Il progetto urbano in Italia. 1940-1990. Alinea, Firenze 2005

Armetta, Antonella (eds.): Architetture universitarie del 20. secolo e loro modelli di riferimento. Palermo University, Palermo 2014

**publications concerning the coeval architecture**

Bizzotto, Renata; Chiumenti, Luisa; Muntoni, Alessandra (eds.): Cinquant'anni di professione. Rome 1983

Fabbri, Marcello (eds.): Architettura e urbanistica in Italia nel dopoguerra: l'immagine della Comunità. Gangemi, Rome 1986

Soletti, Adriana; Belardi, Paolo (eds.): Architettura contemporanea in Umbria. Nuove tendenze. University of Perugia, Perugia 1996

Cellini, Francesco; D'Amato, Claudio (eds.): Mario Ridolfi: Manuale delle tecniche tradizionali del costruire: il ciclo delle Marmore. Electa, Milan 1997

Valacchi, Fabrizio; Roda, Riccardo; Burroni, Enrica (eds.): Progettare nella città contemporanea. Progetti ed opere per Siena. Alinea, Florence 2002

Belardi, Paolo: L'architettura 1946-1959, in: Ponti, Antonio Carlo; Boco, Fedora (eds.): Terra di Maestri, Artisti umbri del Novecento 1946-1959. Edilmond, Città di Castello 2004, pp. 49-54

Belardi, Paolo: L'architettura 1960-1970, in: Ponti, Antonio Carlo; Boco, Fedora (eds.): Terra di Maestri, Artisti umbri del Novecento 1960-1968. EFFE Fabrizio Editore, Perugia 2005, pp. 43-49

Pisani, Mario: Lineamenti di storia dell'architettura contemporanea. Umbria 1981-2000, in: Ponti, Antonio Carlo; Boco, Fedora (eds.): Terra di Maestri, Artisti umbri del Novecento 1981-2000. EFFE Fabrizio Editore, Perugia 2005, pp. 70-89

Belardi, Paolo: L'architettura 1969-1980, in: Ponti, Antonio Carlo; Boco, Fedora (eds.): Terra di Maestri, Artisti umbri del Novecento 1963-1980. EFFE Fabrizio Editore, Perugia 2006, pp. 69-75

Avellino, Raffaele (eds.): Percorsi d'architettura in Umbria. Publisher Centro Italia, Foligno 2010

Canali, Ferruccio: L'architettura del Novecento, in: Avellino, Raffaele (eds.): Percorsi d'architettura in Umbria. Editrice Centro Italia, Foligno 2010, pp. 531-607

**Anatomical-Surgical Academy**

Perugia | 1981 | 1971-1975 | Giuseppe Nicolosi

Biscottini, Gioia: L'Architettura contemporanea in Umbria attraverso le riviste (1945-2009). Graduate thesis in architecture (advisor: prof. Ferruccio Canali). Florence University, 2011

Duranti, Massimo; et. al. (eds.): UAC. Umbria arte contemporanea. Edition Big Project, Perugia 2012

Bibliographical investigation

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Anatomical-Surgical Academy

Perugia | 1981 | 1971-1975 | Giuseppe Nicolosi

**publications concerning the urban context**

Marconi, Plinio: Concorso per il Piano Regolatore di Perugia, in: Architettura. Rivista del Sindacato Nazionale Fascista Architetti, 11., 1932, 8, pp. 423-444

Grohmann, Alberto: Perugia. Laterza, Rome, 1990

Barcaccia, Stefano: Temi di città. Perugia/Architetture 1950-2014. Comune di Perugia, Perugia 2014

Bibliographical investigation

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### insertion of the building in the historical-architectural-typological context

#### at historical level

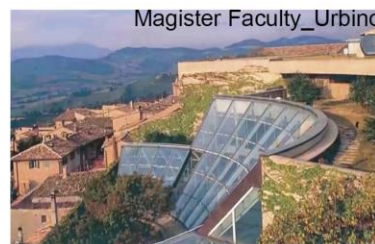
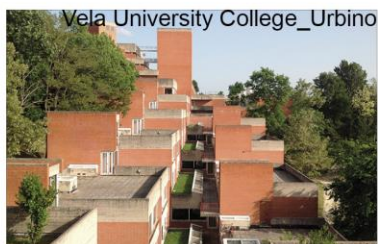
Nicolosi realizes the new Perugia University buildings after the Second World War and, even if the Anatomical-Surgical Academy belongs to a later period, it can be considered part of the whole intervention started about twenty years before with the Great Hall. But Perugia isn't destroyed by the war and its historical centre is almost completely preserved. Therefore, Perugia has the possibility to increase its buildings without the urgent need of giving a roof to homeless, as in the case of the cities destroyed by the war. The extension of the city occurs mainly in the areas outside the historical walls while, inside them, some historical buildings are restored and converted or empty areas are constructed (in particular, realizing new university buildings). Anyway, both the reconstruction and the new expansion take care of the historical centre and, from the medieval city, identifies those principles of a social city for applying them to the contemporary one. Different is the situation in Terni, the other main Umbrian city, because in this case its historical city was almost completely destroyed. Here a great role is played by Mario Ridolfi, who decides not to refurbish the historic urban fabric, but only to transform it through new architecture. In this way the periphery joins the old city.

#### at urban level

In Perugia, the Town Planning itself allows to insert new realizations inside the city centre. The Town Planning has been defined by Bruno Zevi in 1956 and adopted in 1962. The plan indicates to realize the new university buildings in the historical centre, in the voids and interstices among the old buildings. Against these principles goes the first variant, which considers periphery for the realization of the new Faculty of Engineering and the new Hospital and Faculty of Medicine and Surgery. Nicolosi creates a university citadel that consists in an urban project able to change and improve the relationships among the buildings. An important contribution to the development of Nicolosi University project is given by the collaboration, and friendship, with the then Dean Giuseppe Ermini. In fact they share the same principles and ideas about how the new university campus in Perugia should have been. The full agreement between the two protagonists makes possible the realization of public buildings and spaces, completely in the service of the people and of the city, able to improve the perception and the life in the city and to add value in it.

#### at architectural and typological level

Nicolosi differs from the architectural context of the time. Independently and autonomously he carries on his researches (especially about the materials and the use of bricks) and his own style without following other contemporary Movements or languages. His architecture develops from the specific place for which it is designed and it is characterized (for the public buildings) by evocative spaces, paths through and inside the buildings; his architecture carries out an urban role, other than functional. One of the main features of Nicolosi is the creation of



bricks texture specific for the building that is his only aesthetical device. Together with the bricks, Nicolosi uses the concrete for the structure, in some cases on sight.

It is possible making an architectural and typological comparison with other contemporary interventions. The most significant is the Giancarlo De Carlo experience in Urbino with which there are many similarities with the Nicolosi University campus in Perugia. De Carlo also realizes a University campus in the historical centre in the years 1952-1983. The new buildings developed starting from the soil orography, completely adapting to it (differently from Nicolosi, whose architecture prevails on the nature, for De Carlo the natural elevation profile outweighs the architecture). Both in the two campuses the two main materials are concrete and bricks together. In Urbino the buildings are much more glazed, and there is no the use of bricks as a decorative element, like in Perugia. The two campuses have an urban function: they house and create social spaces, usable by all the people, and improve the availability and the perception of the historical centre, also by modifying the connections.

In other medieval cities too, there is a tendency to locate the Faculties in the historical centre, also by using historical buildings (like former monasteries, former barracks, former schools, and former hospitals). Exceptions to this procedure (as happens in Perugia) are the Faculties of Engineering and Medicine that, having the necessity of using specific facilities and spaces for the technical equipment, need appropriate constructions.

## sheet summary

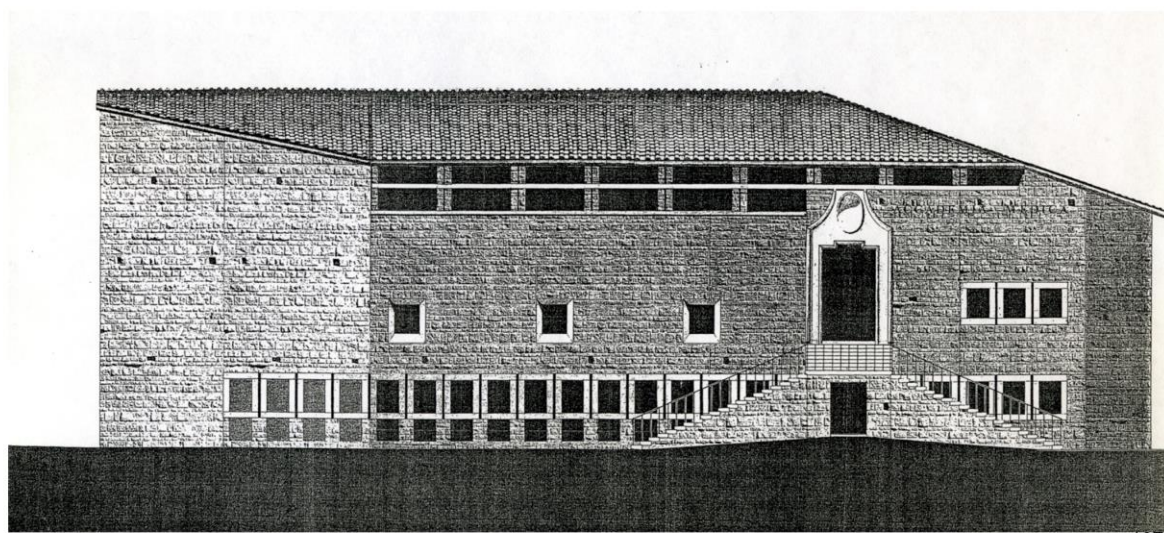
	from publications concerning the designer		elements should be preserved
the designer	main typology he deals with	residences and churches + urban planning	
	influence by the geographical context	<input type="checkbox"/> yes <input type="checkbox"/> no	
	recurring materials	brick and concrete	bricks texture
	designer's label	<input type="checkbox"/> yes <input type="checkbox"/> no	bricks texture
	from the designer's publication		
	models	<input type="checkbox"/> yes <input type="checkbox"/> no Saverio Muratori, Ernesto Nathan Rogers Scandinavian Empirism (Erik Gunnar Asplund)	
	main innovations	texture of bricks (ornamental and technical function)	bricks texture
	main contributes	precision, accuracy, methodological coherence, study of details	
	the basis of his thinking	- importance of the minor architecture - new intervention as an extension of the existing space - importance of the designer concept together with the site specificity	- visual relationship with the landscape and with the historical city
the project	from publications concerning the project		
	main elements	- the Great Hall as the main space - organic spaces - curved walls	- the Great Hall - the curved walls and spaces
	from publications concerning the same typology, coeval architecture and urban context		
	important historical characteristics	the building completes the University Campus, scattered in the historical city	
	important urban characteristics	the University Campus creates new urban spaces, new integrations and connections among the historical buildings	urban role
	architectural characteristics	- autonomy of Nicolosi architecture - Nicolosi architecture acting as a urban architecture - architecture strictly connected to the place	urban role
	typological characteristics	urban function of the University architecture	urban role

Anatomical-Surgical Academy

Perugia | 1981 | 1971-1975 | Giuseppe Nicolosi

all the graphics

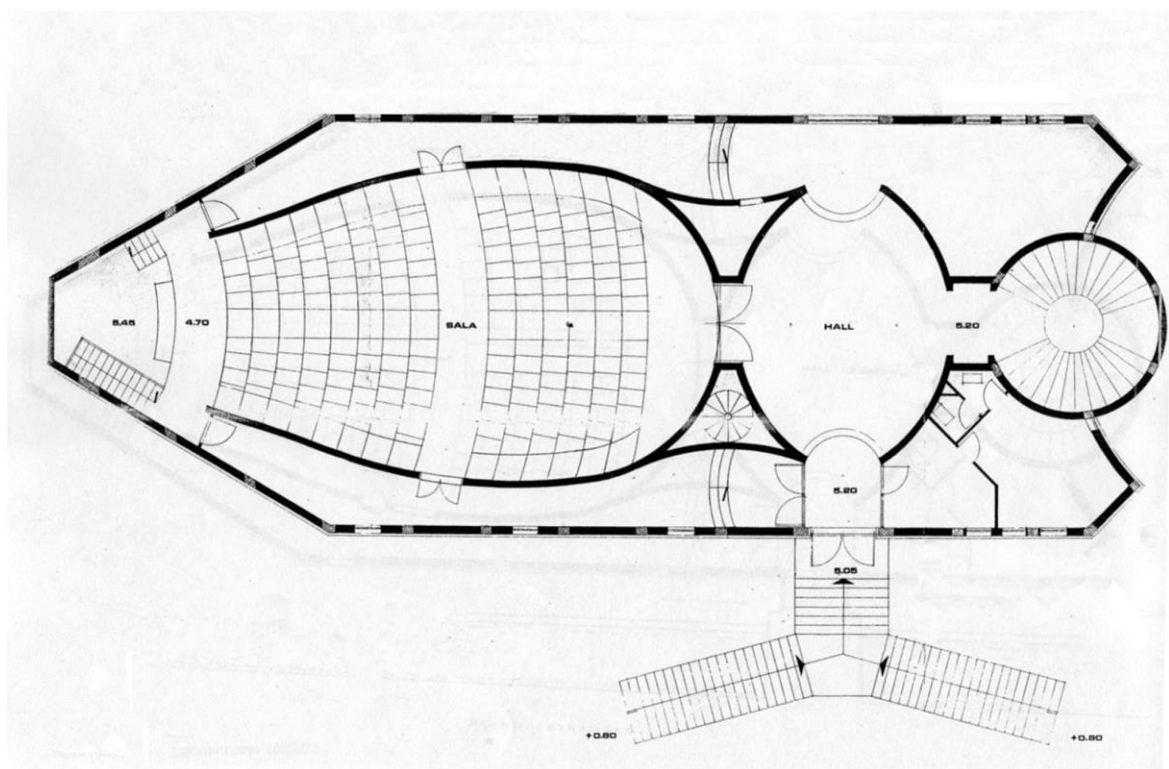
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1971

Archival investigation

2

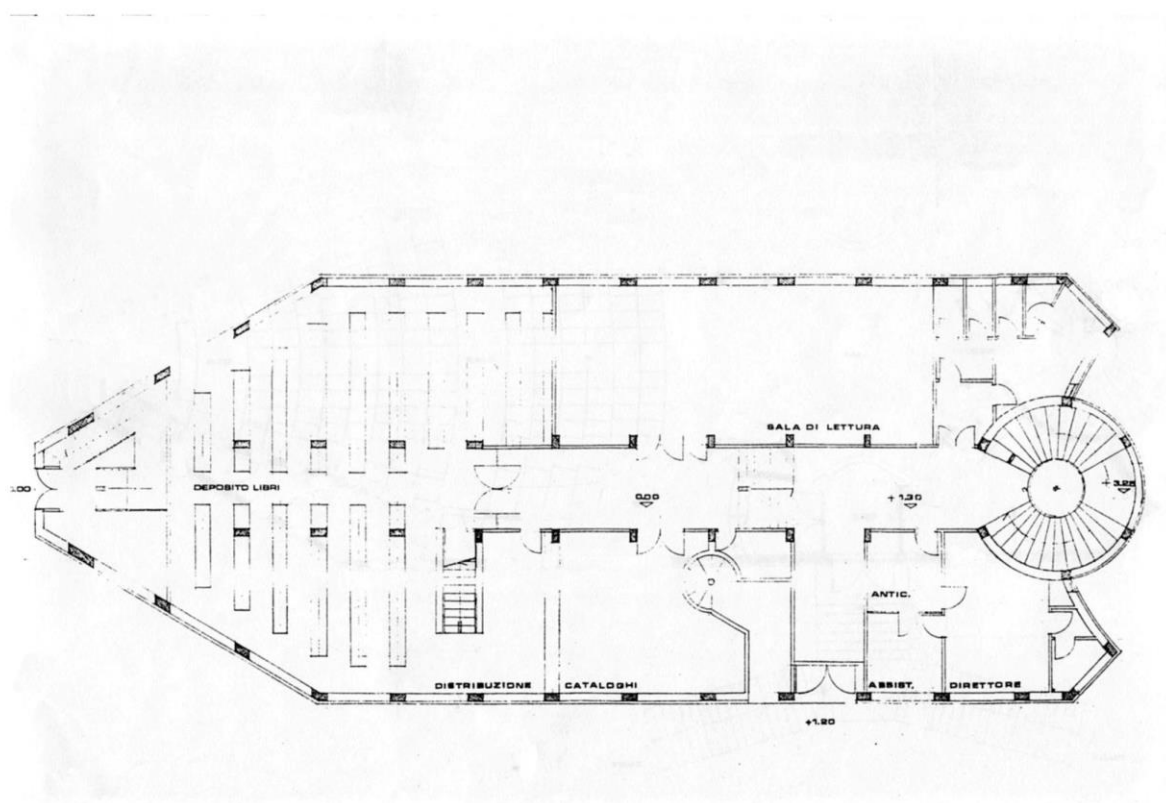


1971

Archival investigation

3

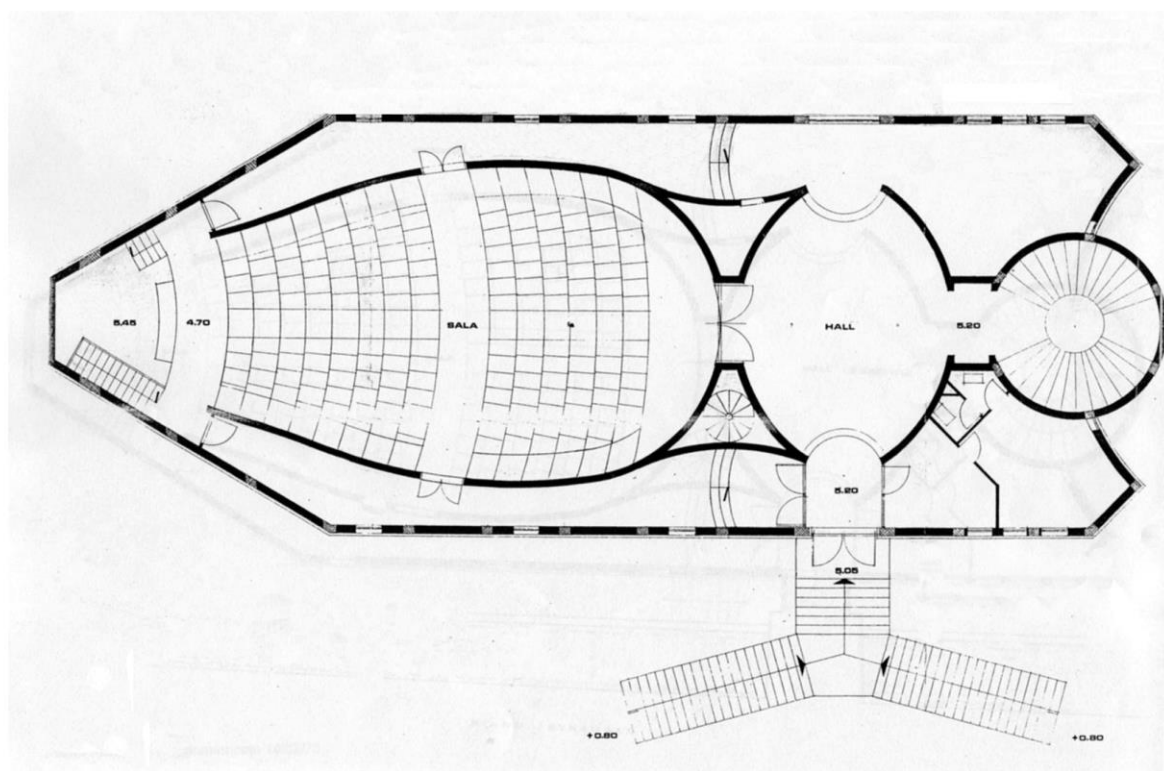




1971

Archival investigation

4

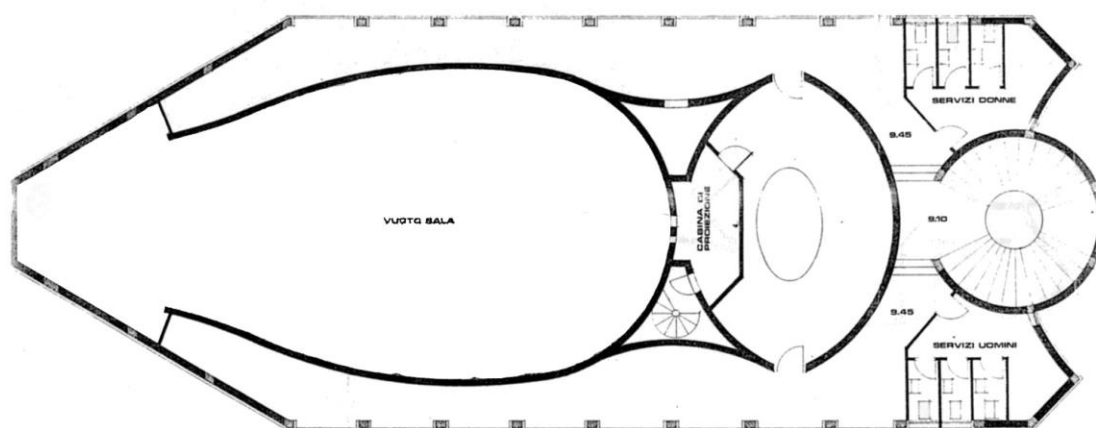


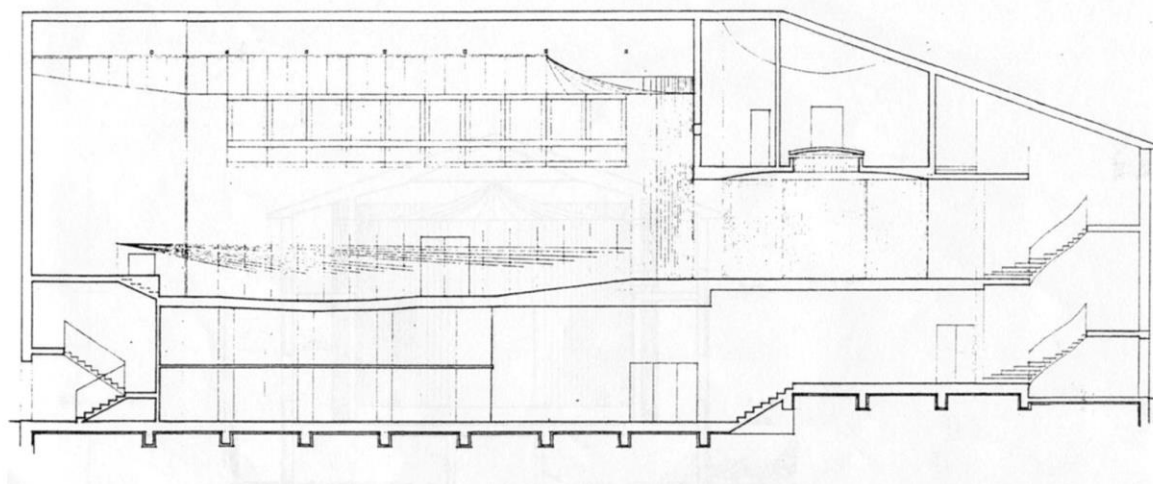
Archival investigation

1971

5



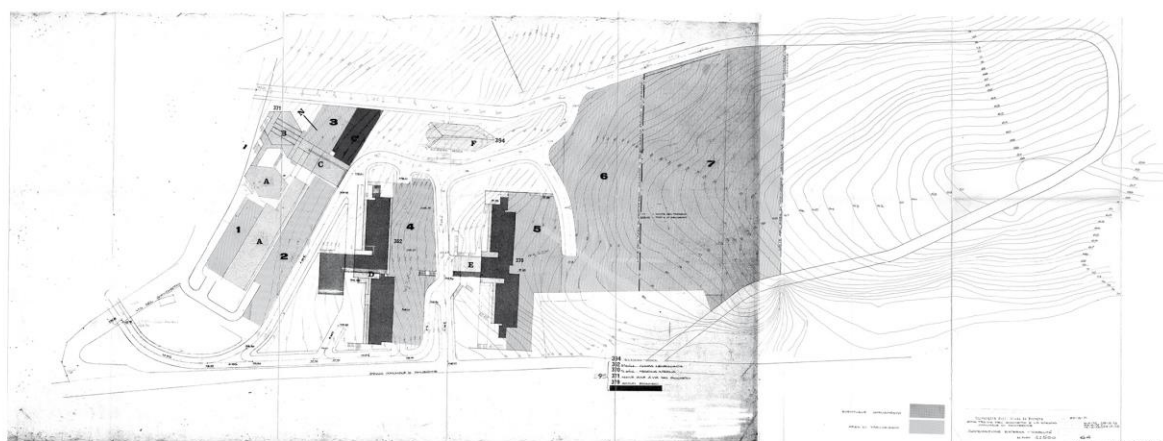




1971

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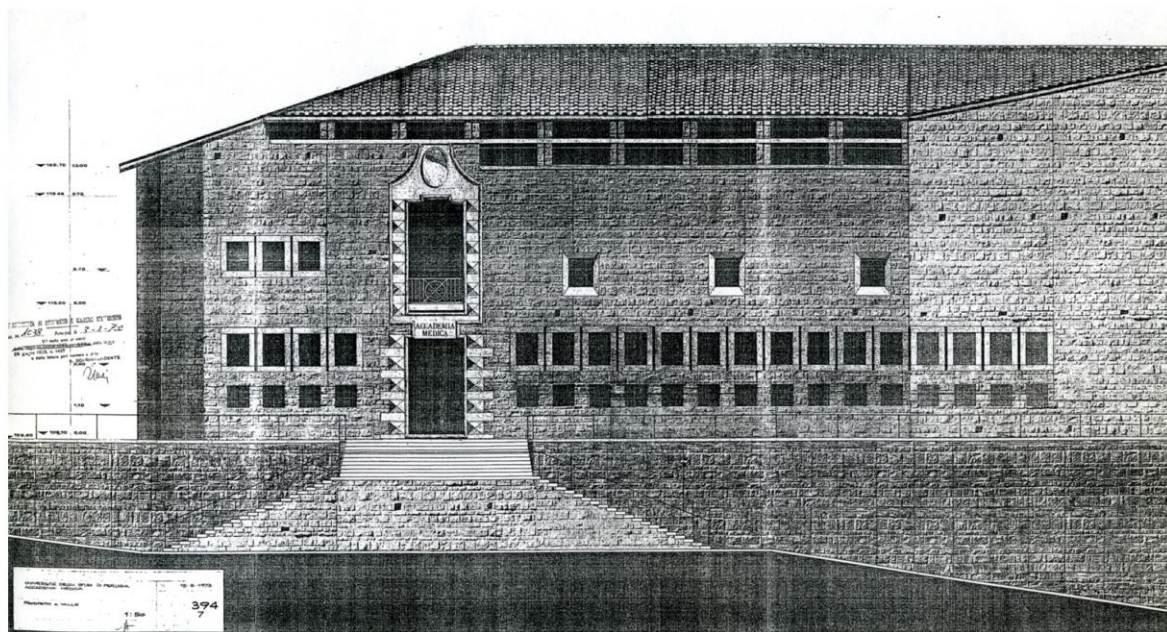
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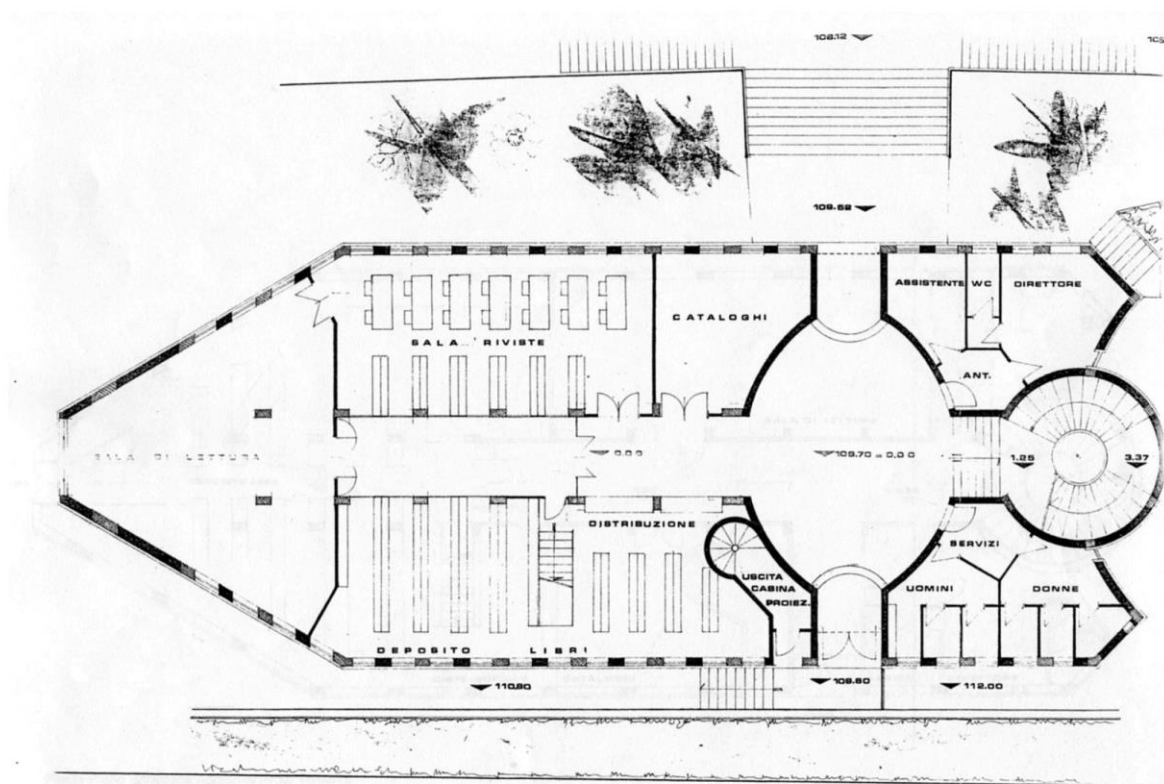
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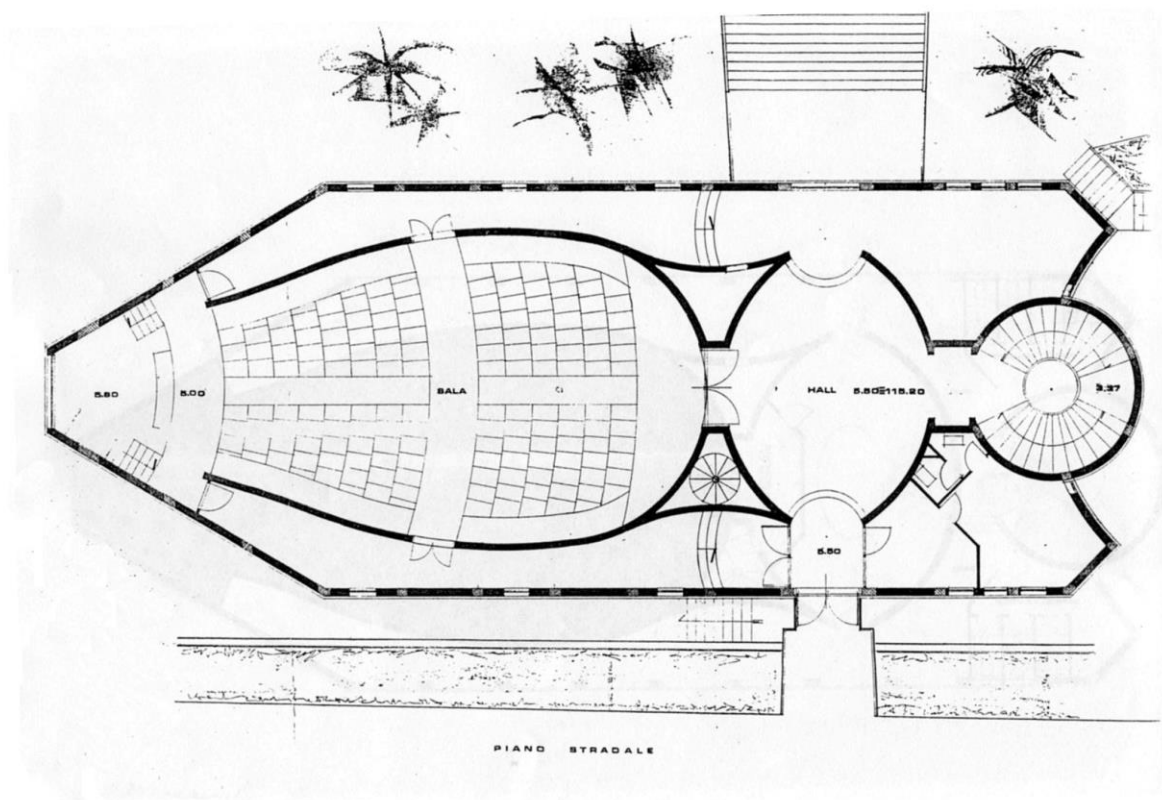
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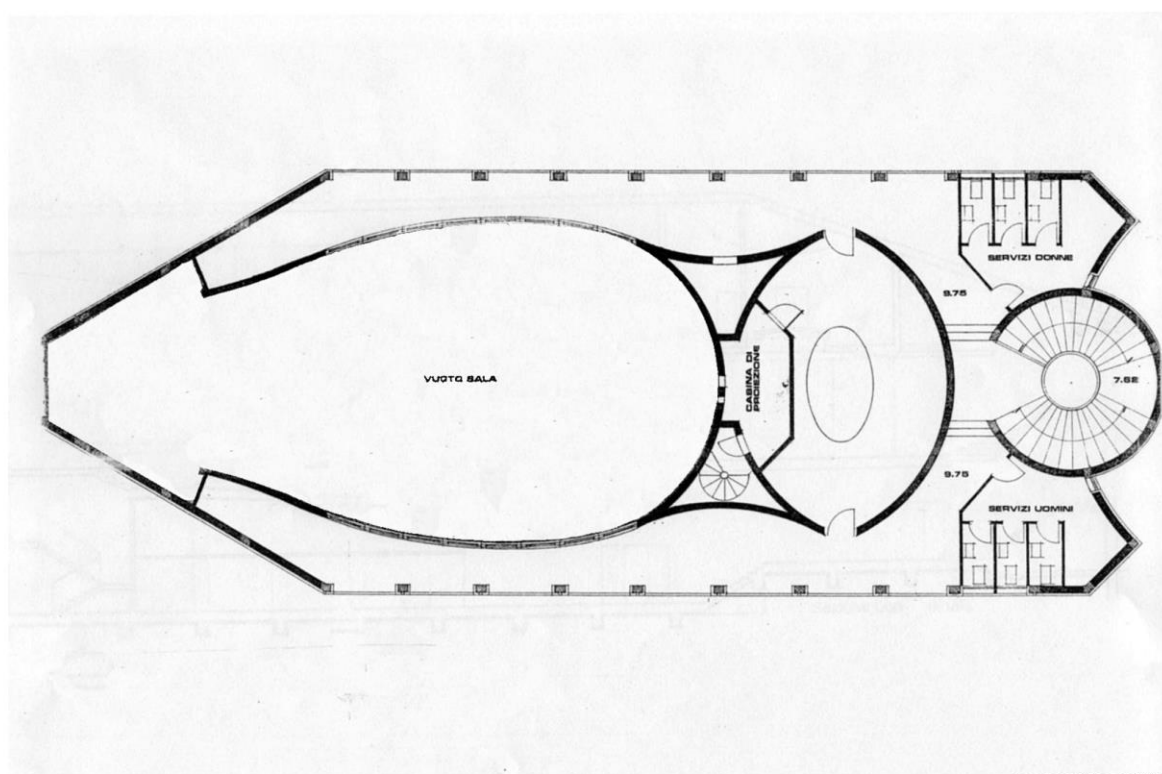
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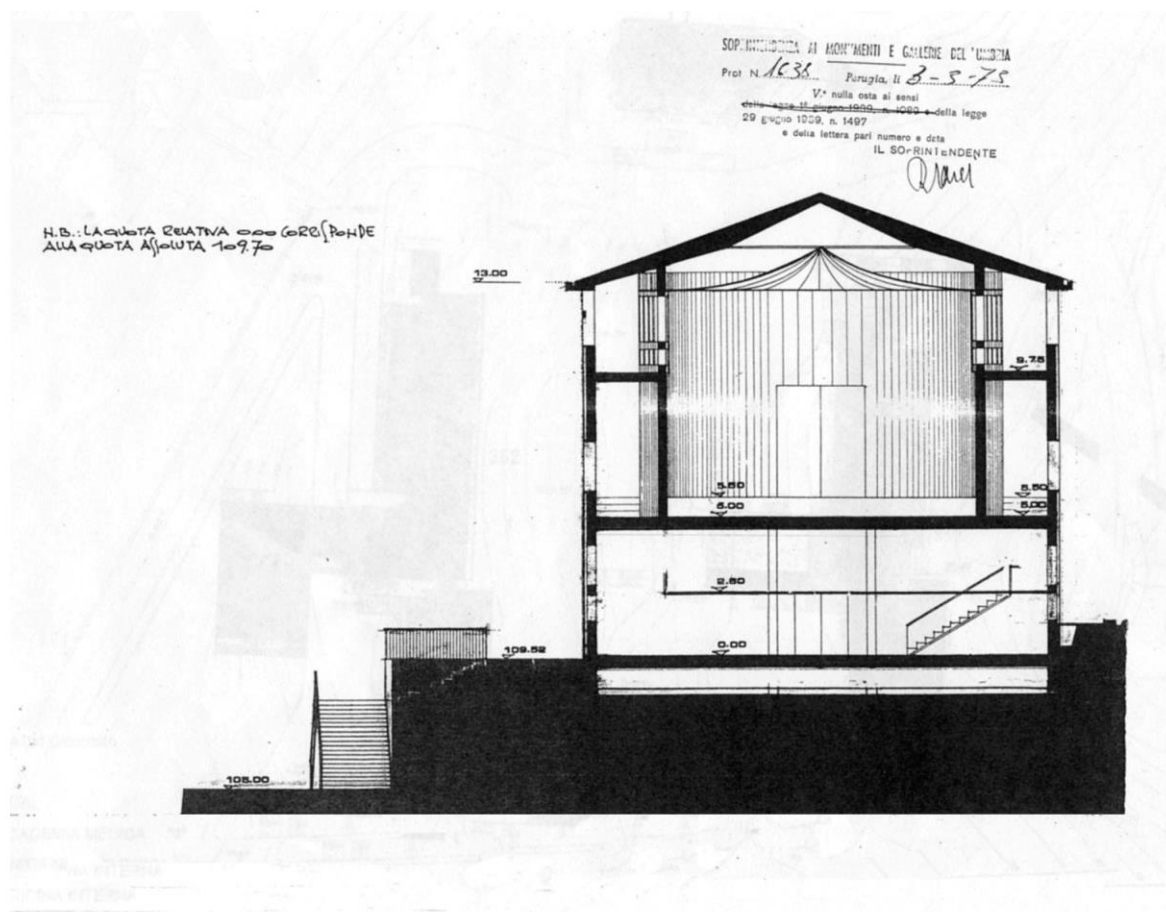
library floor 1973



ground floor 1973



second floor 1973

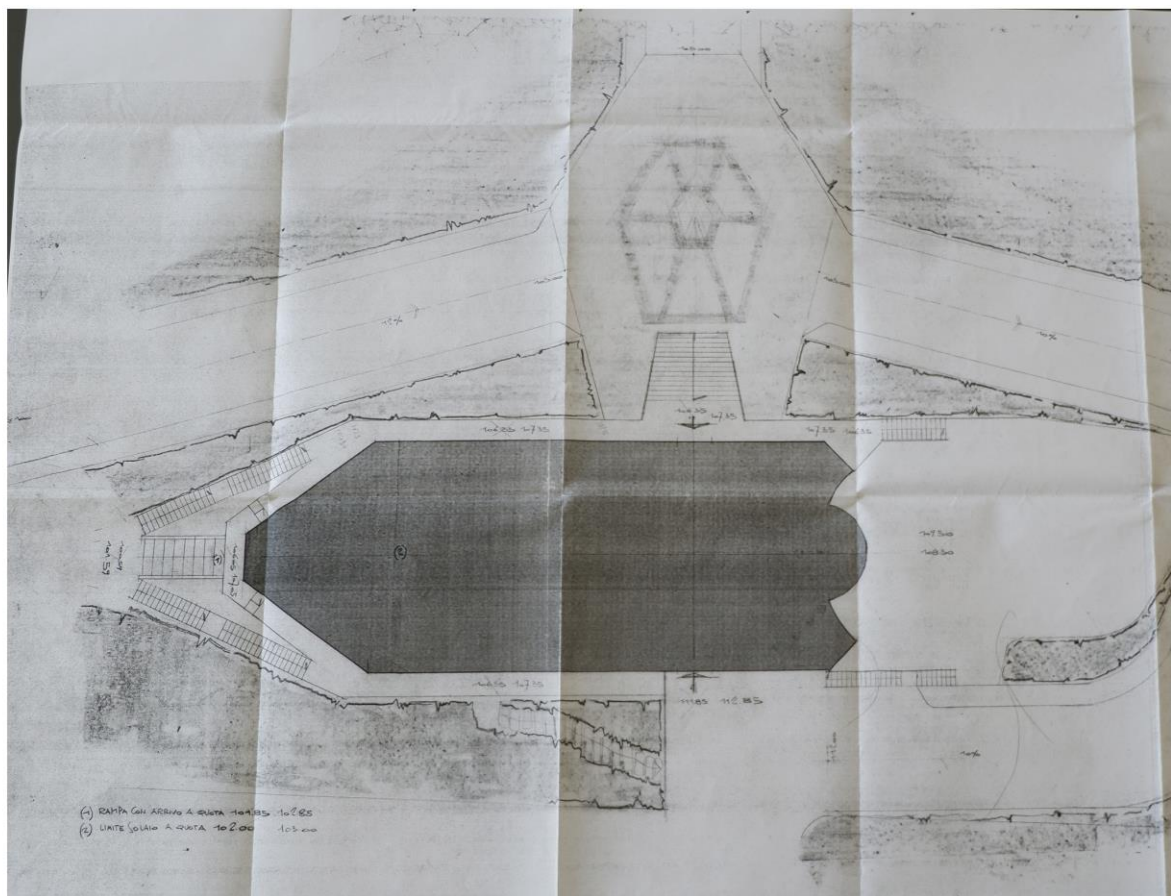


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Archival investigation

13

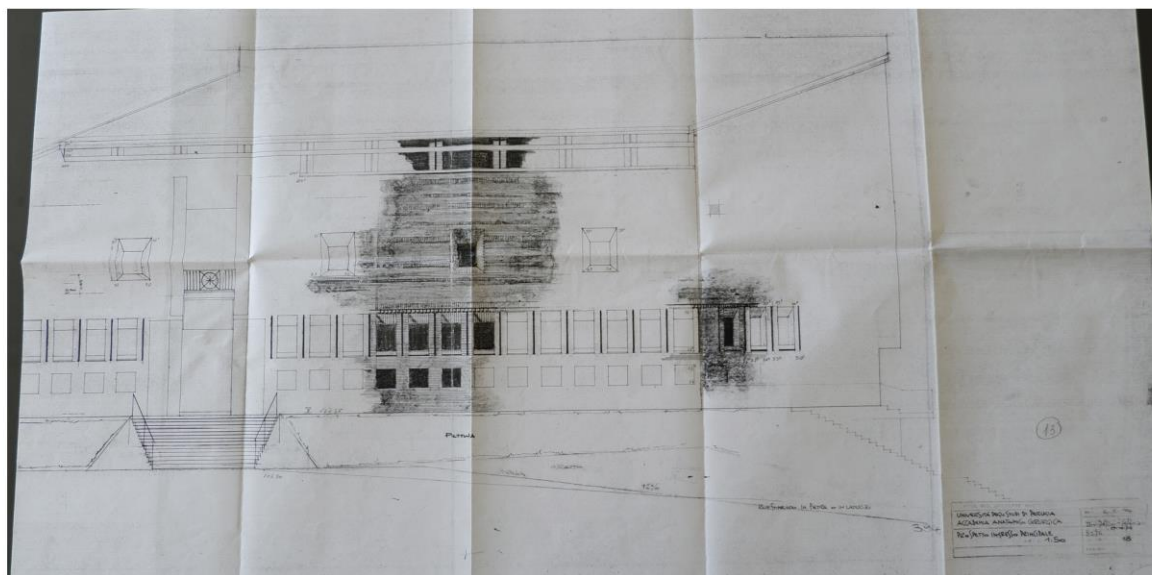




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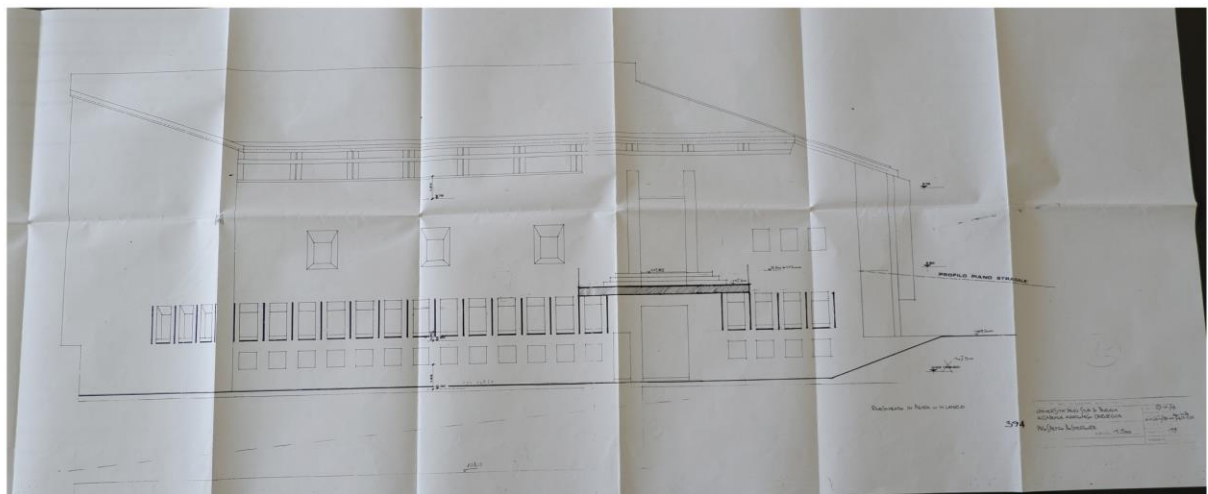
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06.05.1974

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15



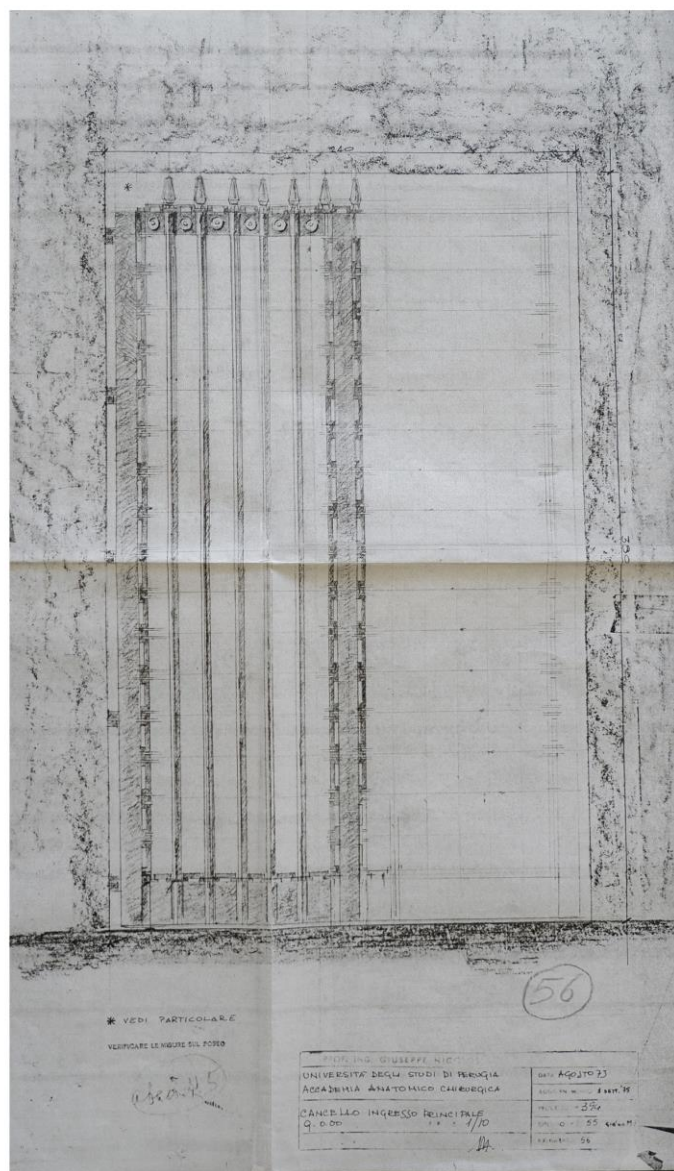
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Archival investigation

16



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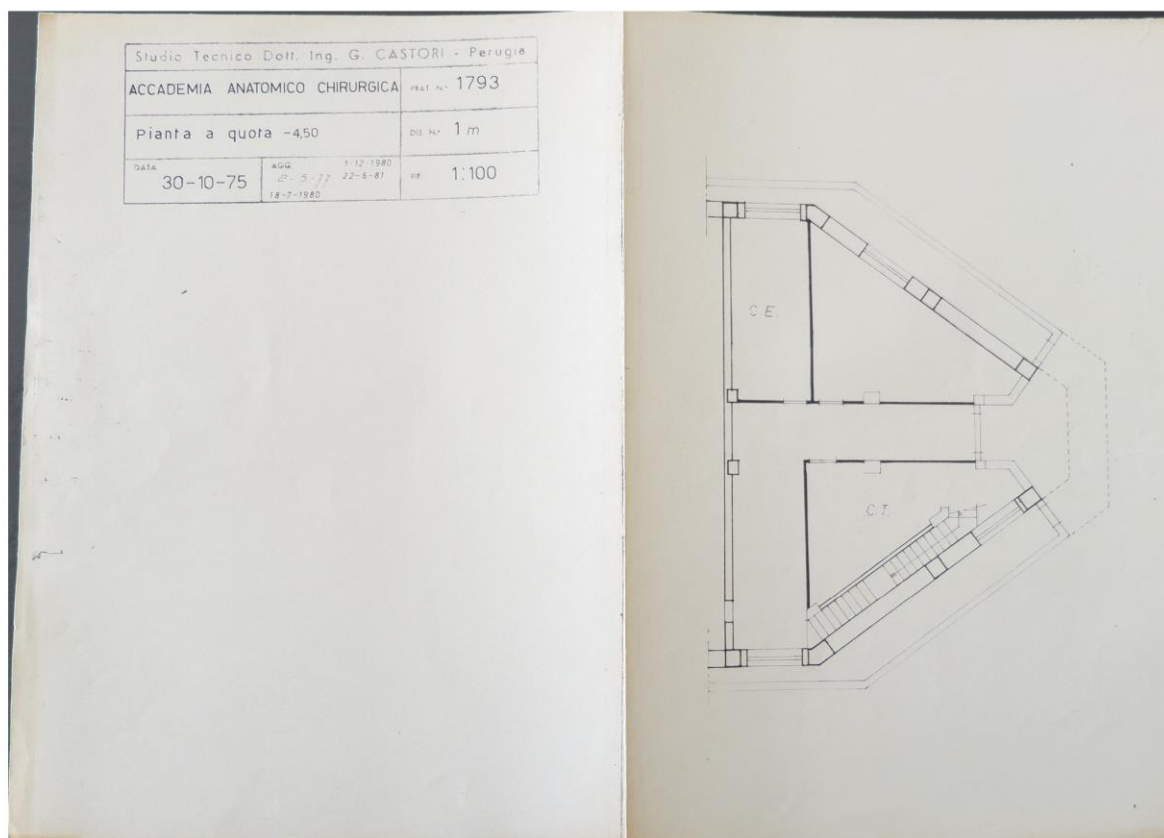


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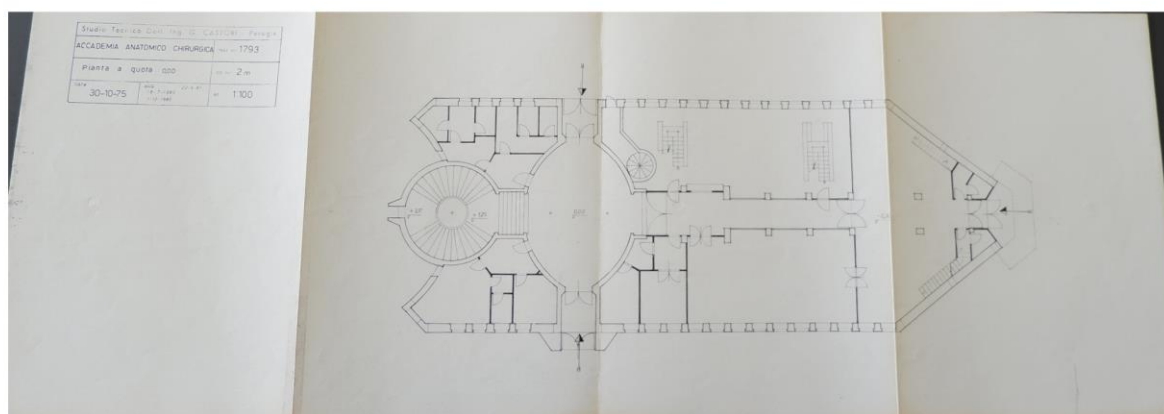
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18





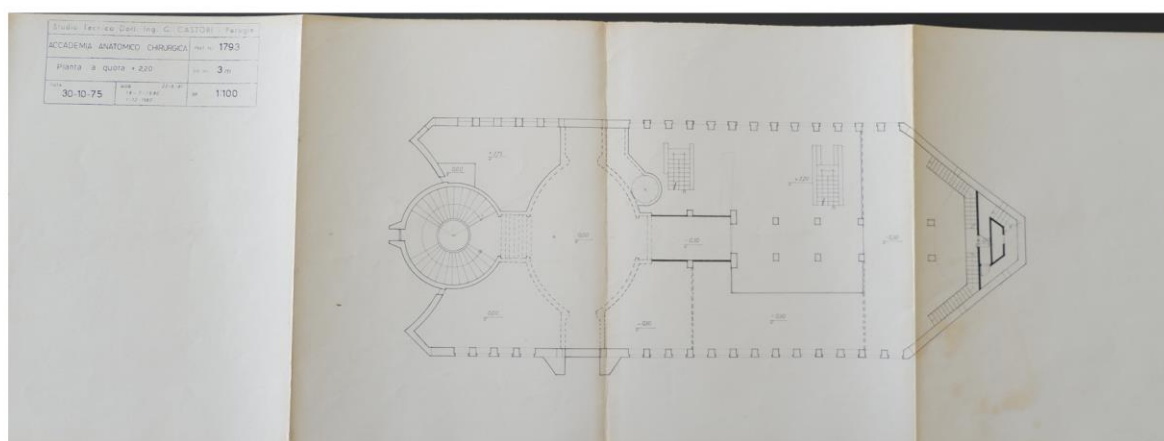
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30.10.1975

Archival investigation

20



30.10.1975

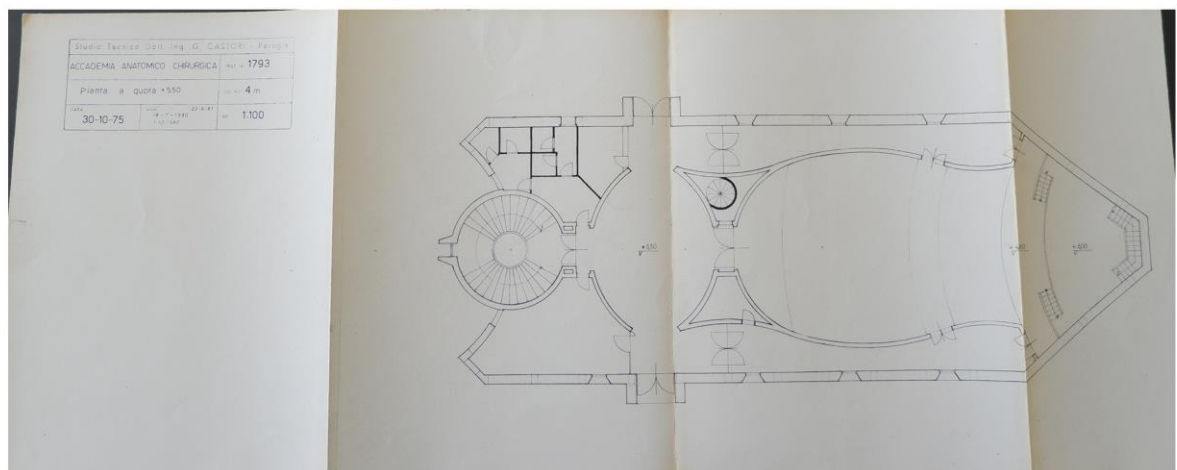
Archival investigation

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Anatomical-Surgical Academy

Perugia | 1981 | 1971-1975 | Giuseppe Nicolosi



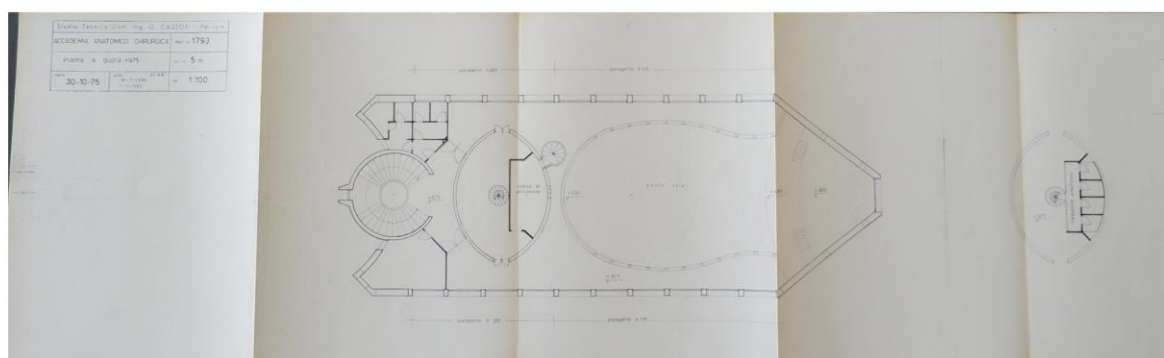
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Archival investigation

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Anatomical-Surgical Academy

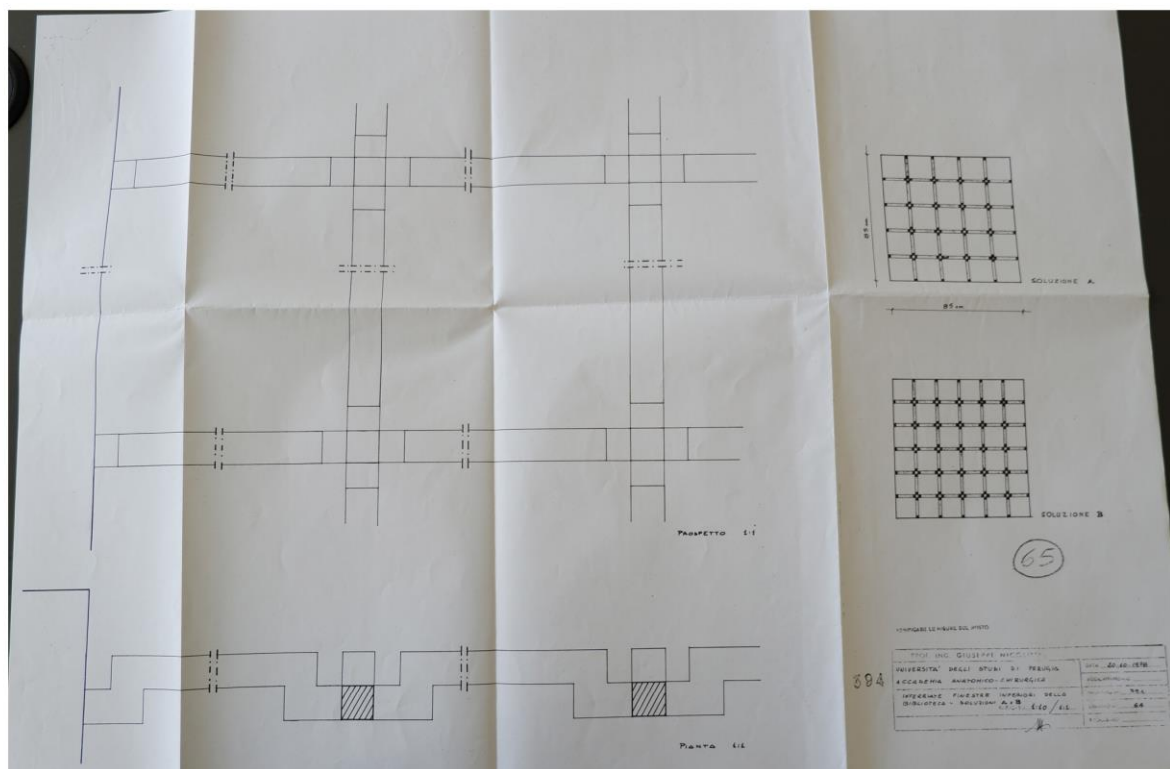
Perugia | 1981 | 1971-1975 | Giuseppe Nicolosi



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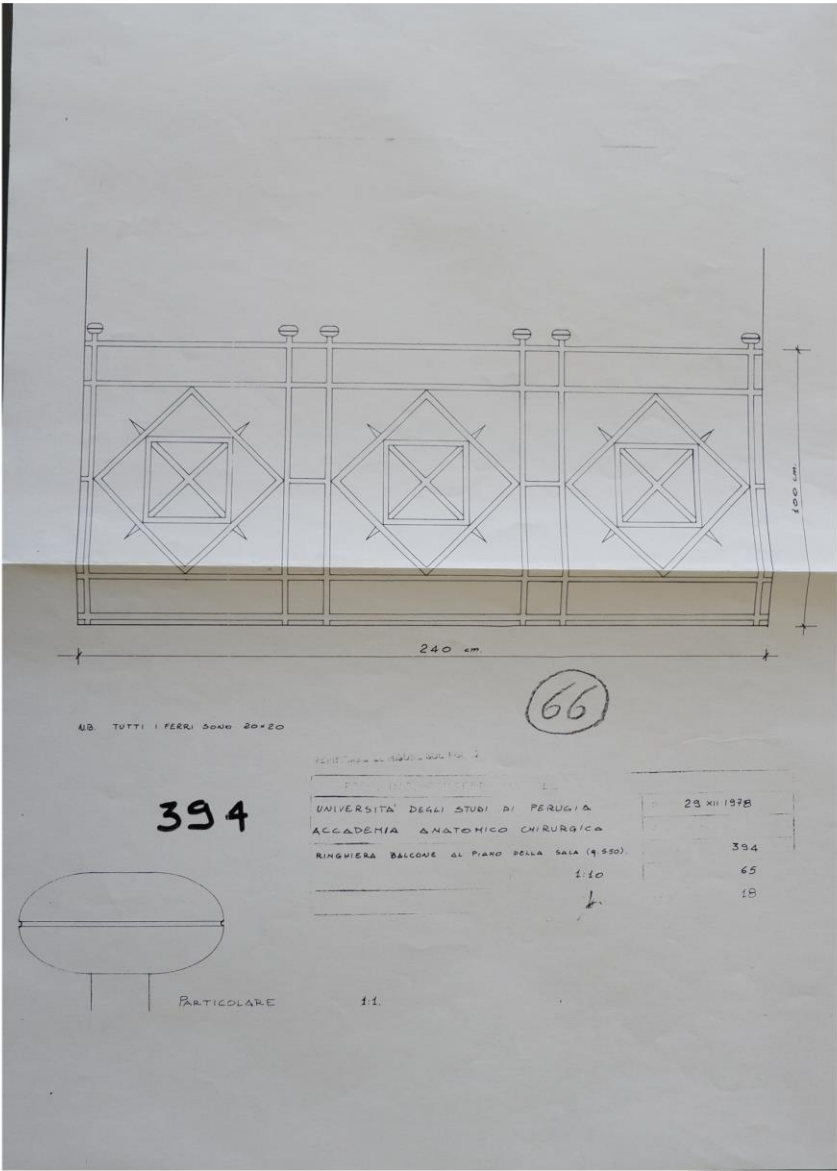
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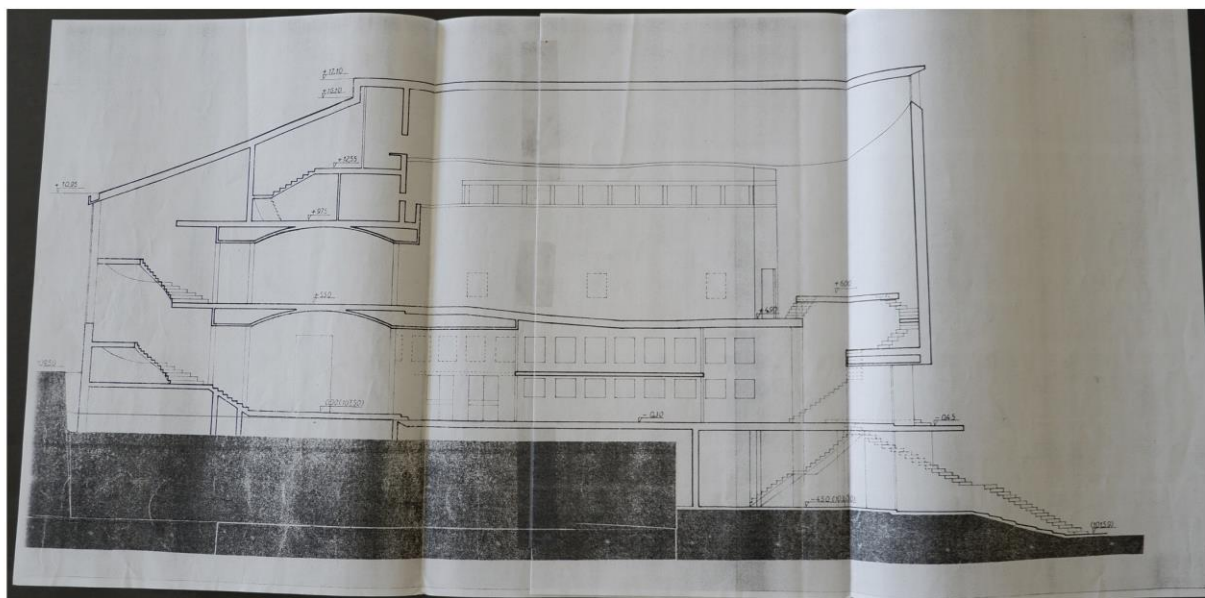


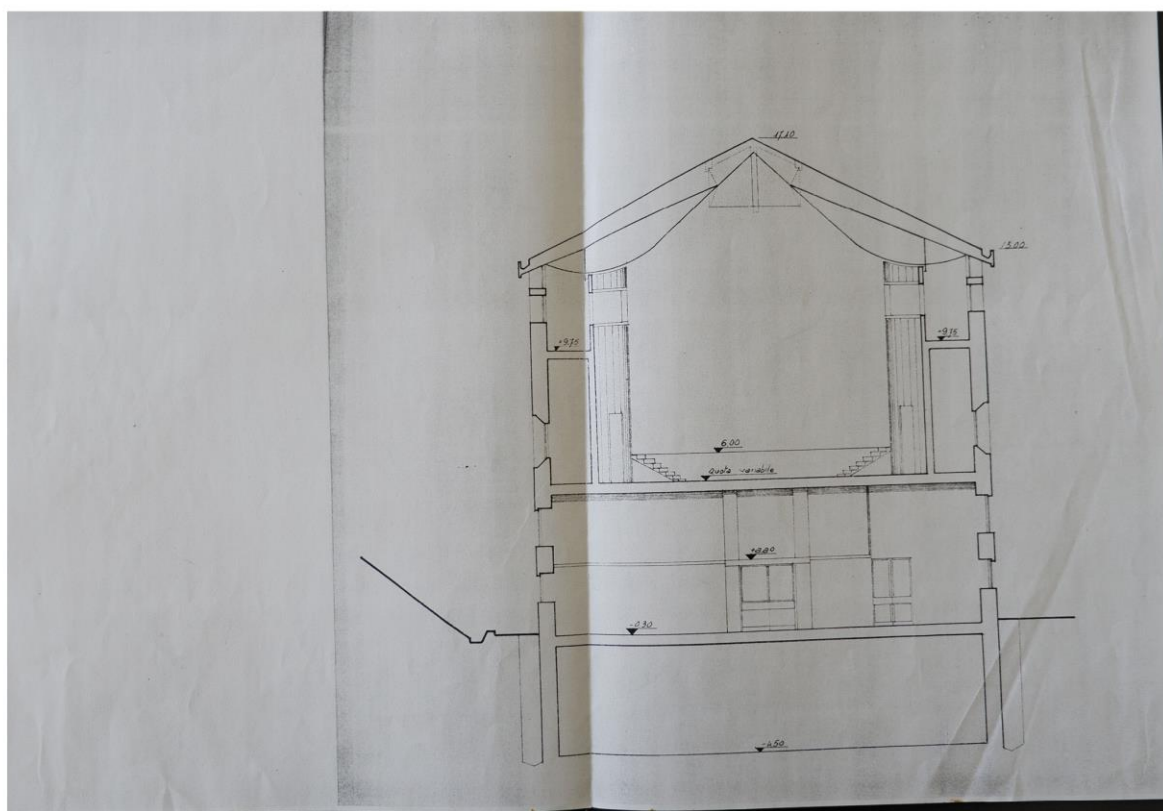
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24

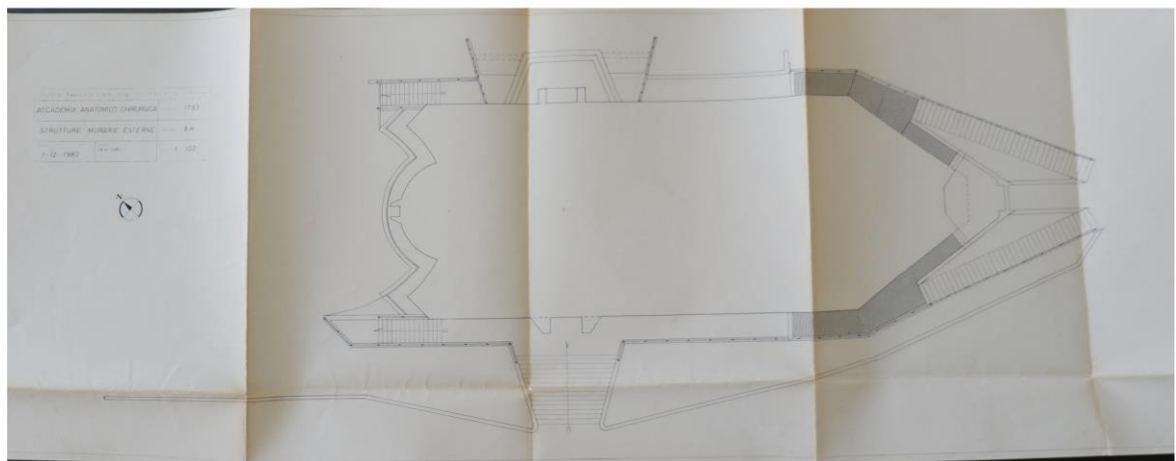






Anatomical-Surgical Academy

Perugia | 1981 | 1971-1975 | Giuseppe Nicolosi



01.12.1980

Archival investigation

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## analysis

### composition

The principles of composition, that are in common to all the three different solutions (in 1971, 1973 and between 1973 and 1974)<sup>1</sup>, are based on the regularity of the building: the main structure is symmetrical (the longitudinal axis is the symmetry axis) and this regularity characterizes both the inner and the outside (including the entrances). The building consists of three floors and of a basement (which doesn't occupy the whole surface of the building). All the floors are characterized by some curved lines that partly correspond to the structure.<sup>2</sup> In the project drawings it emerges that the Main Hall represents the main space, the cornerstone of all the building: in fact it occupies almost half of the whole building, and this is visible both in the plans and in the longitudinal section (page 26). Because of the voluminous space of the Main Hall, the other spaces depend on its shape so that many walls are curved (this is evident in all the drawings). In the same section the covering is also highlighted with the characteristic false-ceiling. In the transversal section also is highlighted the covering and the false-ceiling, the curved walls and the symmetry with respect to the longitudinal axis which reflects on the openings (perfectly identical) and, so, on the facades composition of the long sides. As concerns the facades composition, from the project drawing the idea of depth appears very important and it is given by the openings (by the way they are represented, black filled), by the bricks projections and recesses, by the openings splays, by the splits among the windows of the first level and by the fold of the building and the roof. In the drawings at the pages 15 (from 1974) and 17 (from 1975) the composition of the bricks compares, in which it is specified in detail the three-dimensionality of the texture: in some parts of the cladding the bricks protrude and curve inwards of 2 and 3 cm compared to the level of the facades. In the same drawing also the composition and the correspondence of and among the openings is represented. The composition of some iron details is also considered (in the later drawings at pages 18, 24 and 25), like for the front gate, the railing and the gratings of the lower library windows.

### relationship between plan and elevation

In plan the external walls seem to represent a "theca" containing a "laying man", which is composed by the curved and representative spaces of the building. Externally the building seems to be a religious one, very similar to the other churches designed by Nicolosi. In the longitudinal section the idea of "theca" of the plan get lost, while it is still visible in the transversal section (in particular, even if previous, in the one at page 13); also in the fronts the idea is lost and it emerges the idea of a massive construction as such as uncrossable. The inner space is a complete surprise coming from outside; the only clue of the inner presence of curved lines is given by the "apse" (obtained by the main staircase circular volume), but the particular space which is realized in the Main Hall is totally unexpected. Between the two long sides (anterior and posterior) there is symmetry, because of the longitudinal axis. Therefore, for this reason, they

<sup>1</sup> see in this investigation the sheet "comparison among the different solutions"

<sup>2</sup> This description is also present in the graphical investigation, in the analysis of the planimetric composition.



are equivalent in terms of importance (there is no a real back), even if the anterior represent the main side, since it includes the main entrance and the main staircase.

**comparison among the different solutions**

Three different variations of the project are known, thanks to the numerous drawings left by Nicolosi himself. The first one dates from 1971 (drawings at pages 2-7): the first external siding chosen by Nicolosi was the stone, for all the facades; together with a solemn portal in travertine, the image of the building was very severe and austere: the entry was upstream, at the Hall level, through a double flight of stairs in order to overcome the difference given by the levelling of the site; there wasn't a view in the Hall. The second version belongs to 1973 (drawings at pages 9-13): the main entry was downstream, at the Library level, while upstream there was a direct entry to the Hall occurring through a gangway, instead of the flight of stairs; there is no a levelling of the terrain; a gallery, with a view on the Hall, appears, but it is not open but glazed. The final version was made between 1973 and 1974 and there are very important variations (drawings at pages 15-28): the external siding consists no more of stones but of bricks (even if, in the drawing at page 15 it is written on the bottom by Nicolosi that "cladding in stones or bricks", on a portion of the facades the bricks are represented); the main entrance is the one downstream, but other secondary entrances are put upstream and on the west side; important is the super elevation of the roof in order to build the characterizing false ceiling of the Hall; the gallery is open on the Hall. In the 1973 external solution (at page 14) a hexagonal square is represented. It is put in front of the main entrance (on the north), in the lowest part of the street at the bottom of the staircase. It cross the three streets of the complex of buildings, it is in a central position and in front of the most representative building of the whole complex. It would become a cornerstone, but it hasn't been realized.

Anatomical-Surgical Academy

Perugia | 1981 | 1971-1975 | Giuseppe Nicolosi

urban plans

graphics



Archival investigation

31

## drawings analysis

### planning state of art before the project

- **1930s-1950s**: no Master Plan. New interventions regulated by the Building Code
- **1957**: Master Plan (by Bruno Zevi, Mario Coppa, Giuseppe Grossi and Francesco Zannetti)
- the Umbria state of affairs before the Master Plan:
  - agricultural region; necessity of an extension of the industrial sector.
- Perugia state of affairs before the Master Plan:
  - necessity of sampling and analysing the historical buildings and their state, before any decision concerning them.
  - increasing of the demand of housings in the urban areas (at the expense of the rural ones): need balancing the areas and creating an associative cultural centre.
  - necessity of connecting the raised up industries with the residential areas.
  - necessity of improving the liveability in the city centre by moving some industries, the prison and by creating business, commercial and administrative centres.
  - the Medicine, Agricultural and Veterinary Faculties ask for expansions and improvements.
  - the Institutes of Human Anatomy and Physiology are going to be realized
  - for the Agricultural Faculty an enlargement is considered
  - the Great Hall and the annexed Library are going to be completed.
  - new Houses for students and accommodating buildings, a new Library, a cultural centre, integrated with the Foreign University also for conferences, a Museum of the city history, urban and rural are required.
  - an enlargement of the hospital is necessary

### Plan principles

- complete conservation of the historical city;
- conservation of the landscape heritage;
- housing in new districts connected to the existing town;
- resolution of the problems in connection with the state of the roads without any demolition and through the realization of a ring road external to the city;
- realization of services and industries, on the basis of the needs of the people.
- residential areas planned in the suburbs districts.
- new industrial sites planned in the area down the Pievaiola street.
- reserving of some green areas for every district, maintaining and improving the existing ones and adding new ones
- revision of the Building Code: new rules for the areas, according to the different topographies and to the environmental conditions

- distinction in the zoning according to the population density.
- intent in the Detailed Plans to act in the historical area, to restore crumbling buildings and to recover them for a different use removing the superstructures

**restrictions and limitations**

- areas within the walls safeguarded and mostly of the buildings are bounded as historical heritage.
- carrying out of a cataloguing of the historical buildings: areas "subject to regeneration" f
- many areas to the limits of the walls bounded because of the landscape.
- areas "with bond of relocation": the relocation of the building or of the complex of buildings has to occur within six years.

The Anatomical-Surgical Academy part of the area destined to the enlargement of the teaching hospital, expected since the 1958 Plan and confirmed in the following variants in 1962 and in 1964. In the area there are not particularly limitations, being a place on the edge of the historical city and the rural area outside the city and being already earmarked for the enlargement of the didactic hospital.

Even if not directly in contact with the protected heritage, the relationship, both with the rural and with the historic areas, is noteworthy since it's about a visual relation that Nicolosi considers in his project.

## sheet summary

from the graphics	what emerges	elements should be preserved
<b>composition</b>	<ul style="list-style-type: none"> <li>- geometrical and structural regularity</li> <li>- Great Hall as the main space which influences all the others</li> <li>- curved walls characterizing the spaces</li> <li>- symmetrical long facades</li> <li>- importance of depth in the facades</li> </ul>	<ul style="list-style-type: none"> <li>- the Main Hall space</li> <li>- the curved walls</li> <li>- the facade composition (openings, bricks texture, splits, splaies)</li> </ul>
<b>relationship between plan and elevation</b>	<ul style="list-style-type: none"> <li>- idea of external walls as a massive and uncrossable theca in opposition to the inside curved open spaces</li> <li>- external idea of a religious building</li> <li>- equivalence between the two long sides (no back side)</li> </ul>	<ul style="list-style-type: none"> <li>- the external massive bricks walls</li> <li>- the symmetry between the long sides</li> </ul>
<b>comparison among the solutions</b>	<ul style="list-style-type: none"> <li>- detailed study of the bricks texture (in the last version)</li> <li>- roof superelevation and false ceiling for the Great Hall space (in the last version)</li> <li>- gallery on the Great Hall opened just in the final version</li> </ul>	<ul style="list-style-type: none"> <li>- bricks texture</li> </ul>
from the urban plans	what emerges	elements should be preserved
<b>planning state of art before the project</b>	<ul style="list-style-type: none"> <li>- the Nicolosi's University projects follow the 1957 Master Plan</li> <li>- preservation of the historical buildings without precluding future actions</li> </ul>	
<b>Plan principles</b>	<ul style="list-style-type: none"> <li>- preservation of the historical center and of the landscape</li> <li>- better connections among the districts</li> <li>- actions in the historical center for restoring crumbling buildings, transferring different functions and removing superstructures</li> </ul>	
<b>restrictions and limitations</b>	<ul style="list-style-type: none"> <li>- no limitations for the Anatomical-Surgical Academy area</li> <li>- visual relation with the historical center and the rural landscape outside the city</li> </ul>	<ul style="list-style-type: none"> <li>- maintenance of the visual relationship with the city center and the landscape</li> </ul>

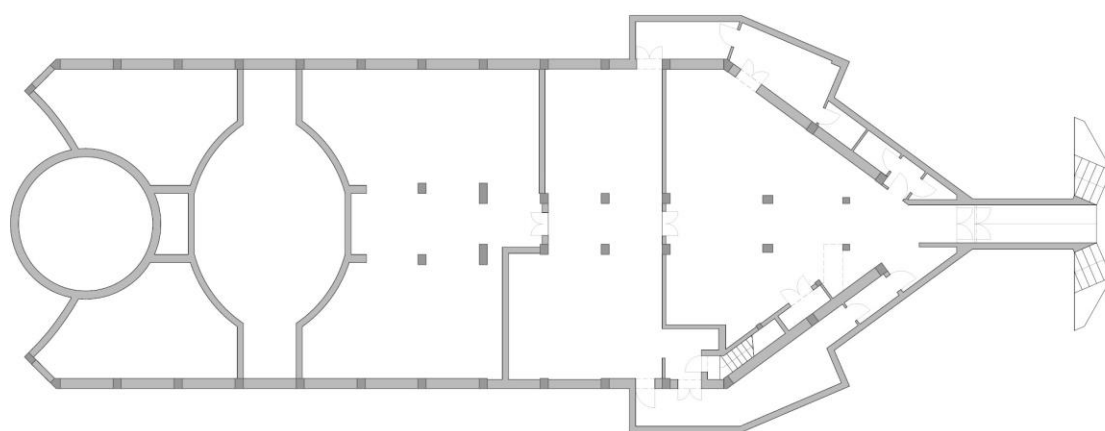
<b>Graphical Investigation</b>	
<b>architectural survey</b>	
plans	2
plans analysis	10
planimetric composition	
function of spaces	
evolution of spaces and intended uses over time	
fronts	12
fronts analysis	16
composition of facades	
relationship between empty and filled	
materials	
coherence with the plans	
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sections analysis	19
the spaces: their relation and their perception	
coherence with the plans and the fronts	
general analysis	20
relationship between functions and spaces	
spaces, elements and devices closely related to the intended use and to the typology	
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<b>sheets summary</b>	27
Graphical investigation	1

plans

site layout



**basement**



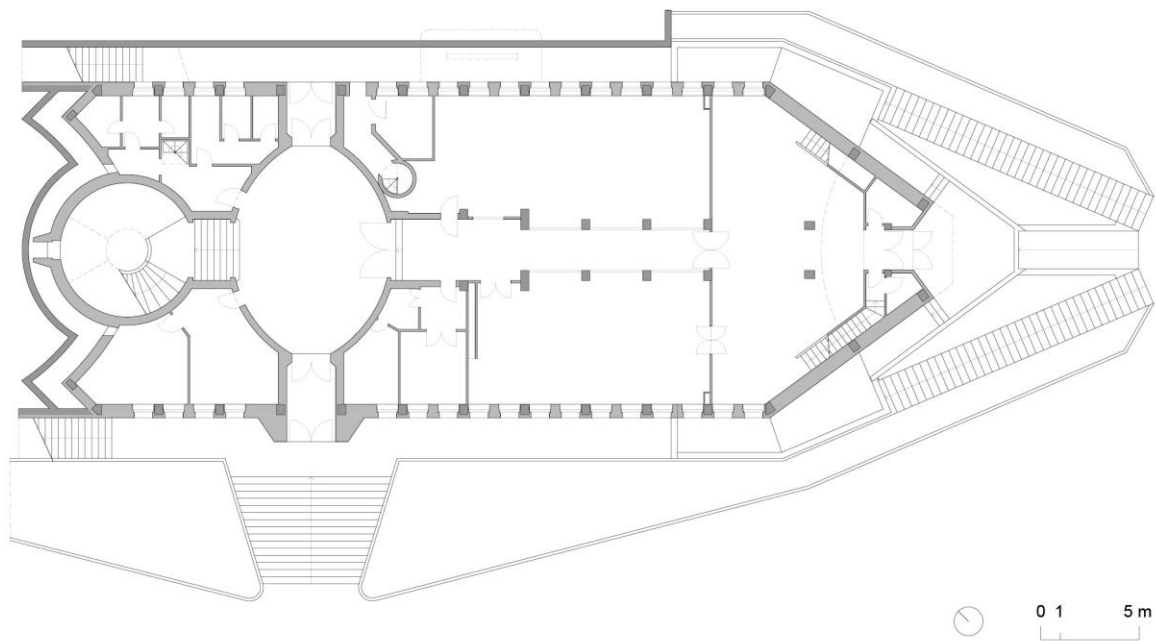


Anatomical-Surgical Academy

Perugia | 1981 | 1971-1975 | Giuseppe Nicolosi

plans

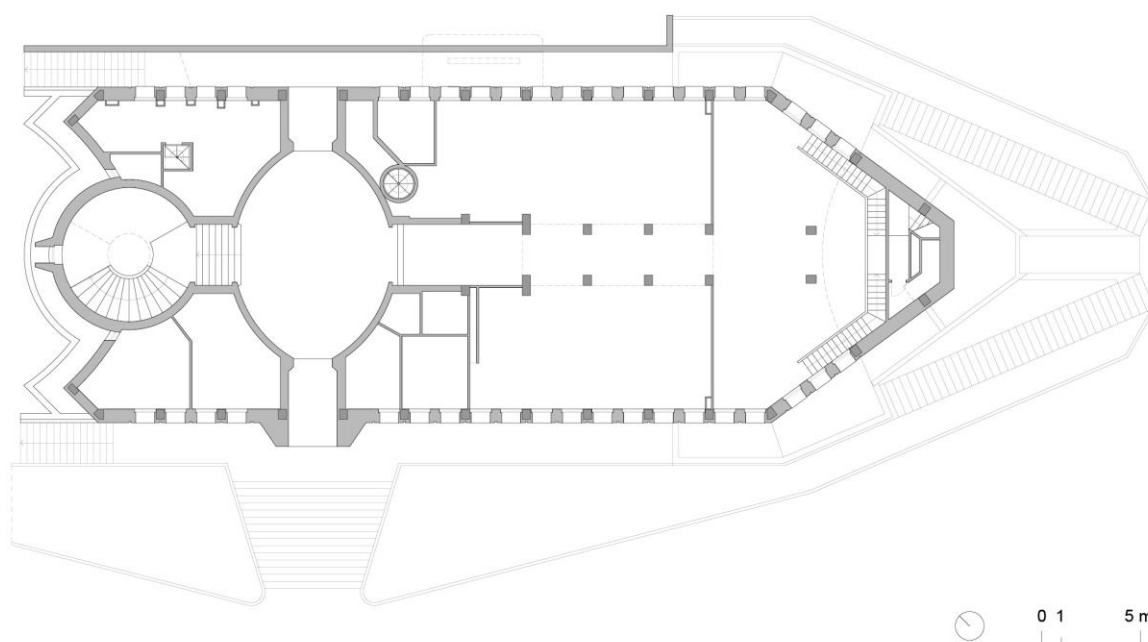
ground floor (-0.30 m and 0.00 m)



Graphical investigation

4

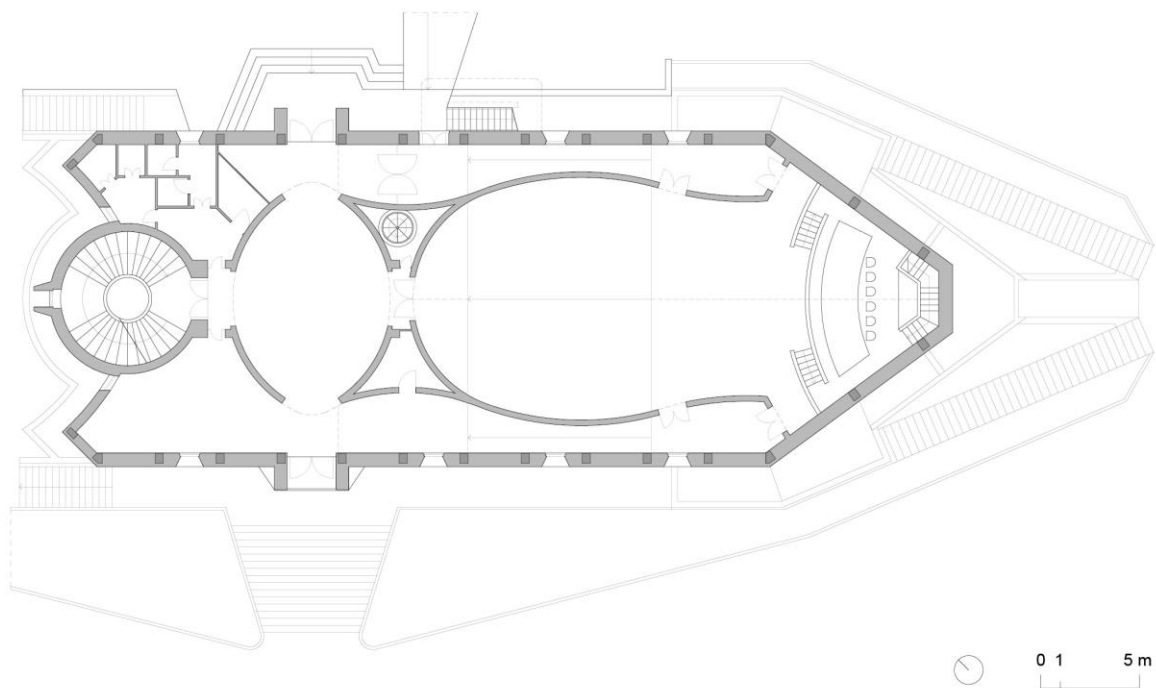
**mezzanine (+3.30 m)**



Anatomical-Surgical Academy

Perugia | 1981 | 1971-1975 | Giuseppe Nicolosi

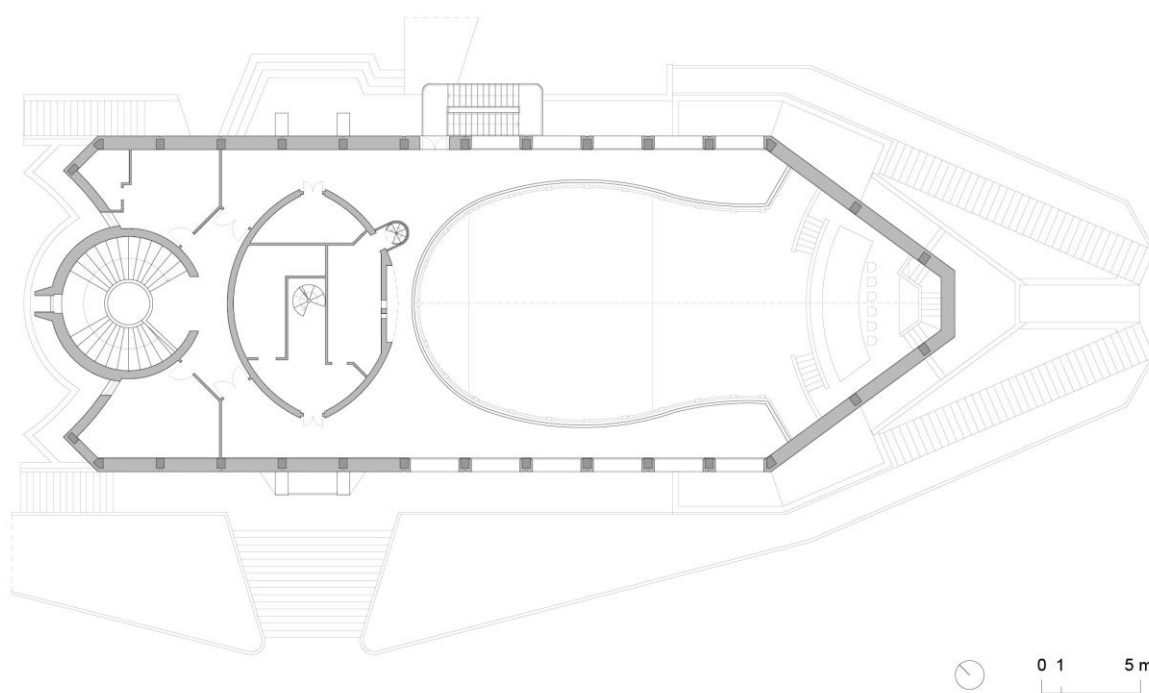
first floor (+4.80 m and +5.80 m)



Graphical investigation

6

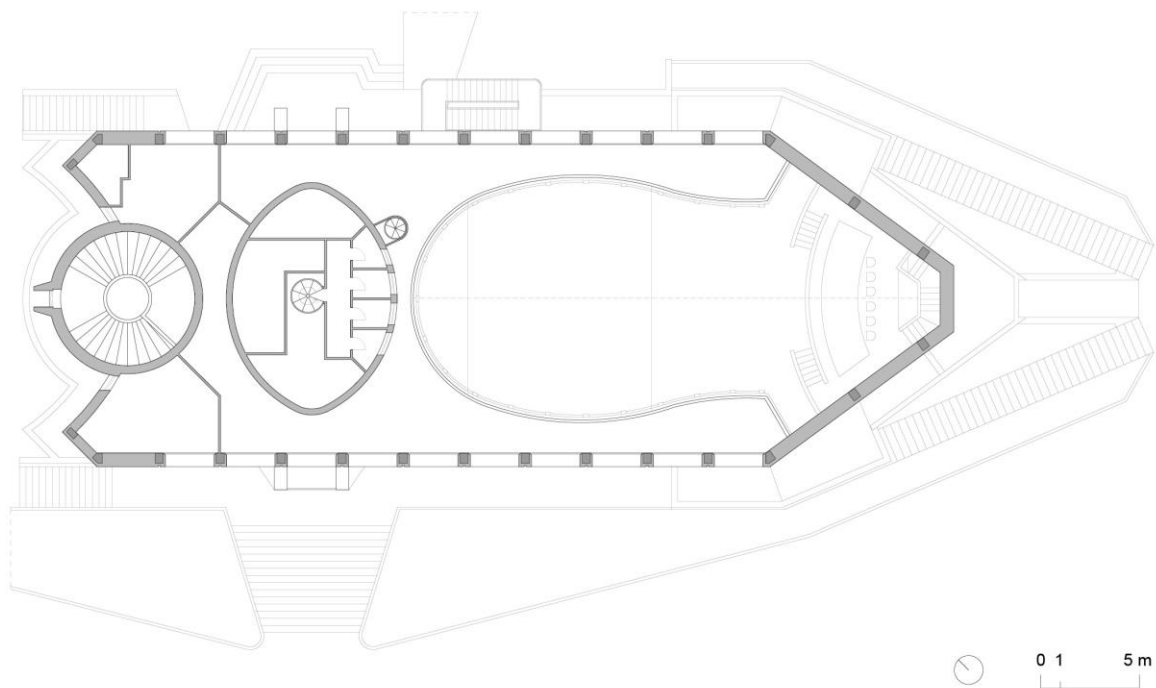
**mezzanine (+9.75 m)**



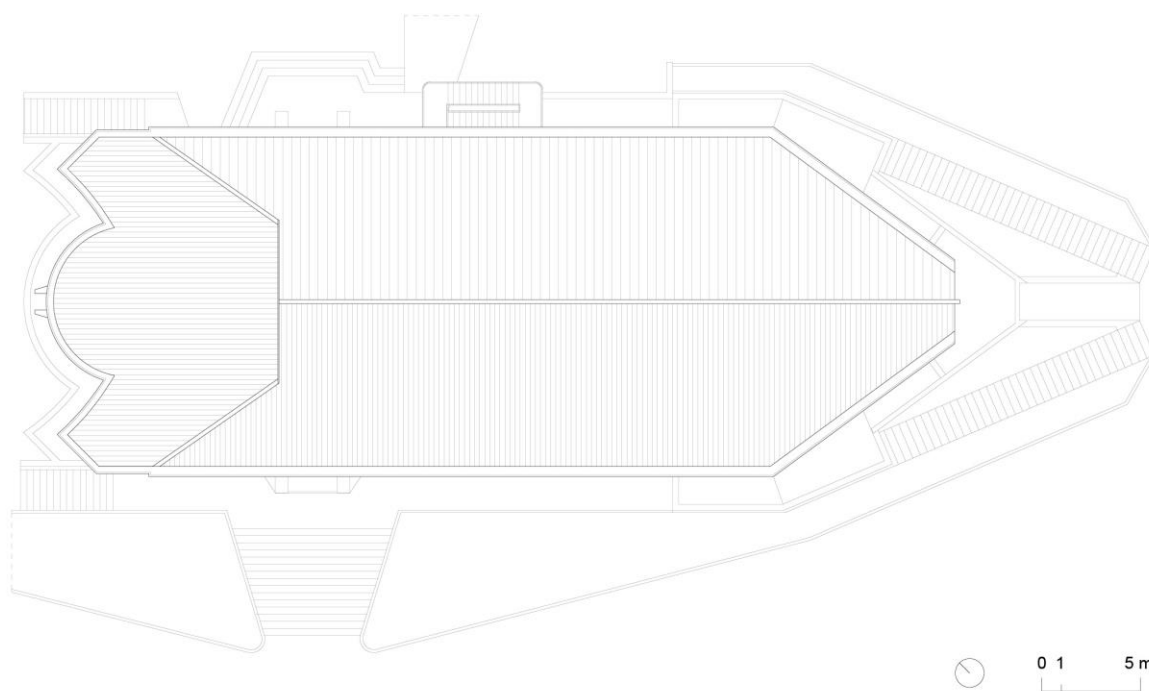
Graphical investigation

7

**second floor (+12.48 m)**



**roof coverings**



## plans analysis

### planimetric composition

The building is placed in a University area in Perugia (the Montelucente district). At the time of the project, two other buildings were being realized in the same area (both destined to the Faculty of Medicine)<sup>1</sup>. Nicolosi put the new building as the background of the complex, at the end of the new axis drawn by the street halfway the two realizing buildings. This choice gives to the Academy a monumentality character. It is placed perpendicular to the axis, in a sloping terrain and in a dominant position on the surrounding landscape. The difficulty of the project has been the location of the main entrances, because of the difference in height (the project was originally expected for a flat terrain).<sup>2</sup> From the plans it is soon evident a great regularity of the composition: the main structure is symmetrical (the longitudinal axis is the symmetry axis) and this regularity characterizes both the inner and the outside (including the entrances). The building consists of three floors and of a basement. All the floors are characterized by some curved lines that partly correspond to the structure. These curved walls determine an anatomical shape, a sort of a "lying man". This shape is maybe determined by the suggestion of the original function of the *Anatomical Surgical Academy* Institution (that has been the studying of the human anatomy until 1923): the curvy room with the elevated gallery from which to observe, recall the anatomical theatre of the ancient *Studium Generale*. Nowadays the charitable trust activity is dedicated to house scientific meetings, to promote degree and doctoral prizes and to house keynote lectures.

### function of spaces

The Anatomical-Surgical Academy is designed for specific functions: it houses a library on the ground floor and a big conference room on the first and second floors, besides the presidency and the charitable trust *Anatomical Surgical Academy*. The architect Nicolosi has designed the building for these original functions that are not changed over time. In particular the conference room (used by the presidency, the Faculty of Medicine and by the trust) influence decisively the spaces (their shape, composition and connections), the choice of materials and the shape of the building itself. In fact, all the spaces that are arranged on the different floors (included that ones on the basement and, in particular, on the second floor) and that surround the main spaces, are at the service of the two main functions, in particular of the big conference room. This big room has a particular "egg" shape ("anatomical" shape), which influence the rooms and the spaces all around, that have been designed in harmony with it, leading to a series of curves and to a characteristic "anatomical space". Moreover, because of its distinctiveness, Nicolosi has tried to give it expression also on the outside: this is the reason of the external terminal tapering of the building, which is an attempt for giving expression to the inner particular form.

<sup>1</sup> See "the description of the building" in the bibliographical investigation (p.14)

<sup>2</sup> For this reason Nicolosi has presented different solutions changing the main entrances any time (see the archival investigation for the different solutions and the "description of the building" in the bibliographical investigation)

**Anatomical-Surgical Academy**

Perugia | 1981 | 1971-1975 | Giuseppe Nicolosi

**evolution of spaces over time**

The spaces function has been maintained till the most recent developments: In 2013 the Anatomical-Surgical Academy has been moved, together with all the Faculty of Medicine and Surgery, to the new Silvestrini concentrated development in Sant'Andrea delle Fratte. The building is since then abandoned.

Graphical investigation

11



Anatomical-Surgical Academy

Perugia | 1981 | 1971-1975 | Giuseppe Nicolosi

fronts



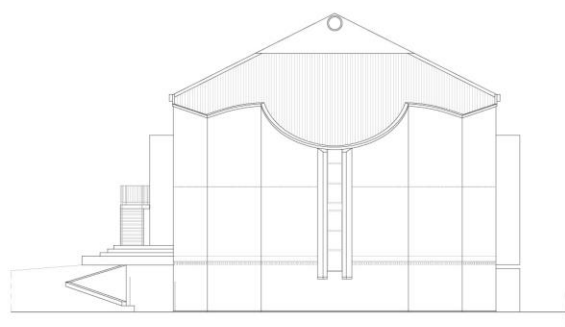
Graphical investigation

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Anatomical-Surgical Academy

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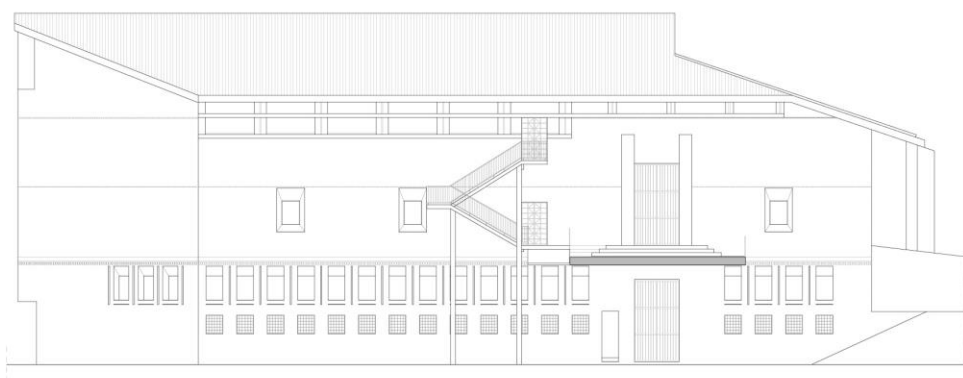
**fronts**



Graphical investigation

13

fronts

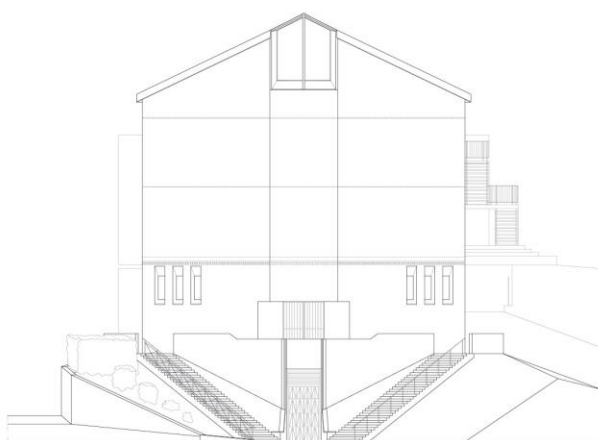


0 1 5 m

Anatomical-Surgical Academy

Perugia | 1981 | 1971-1975 | Giuseppe Nicolosi

fronts



0 1 5 m

Graphical investigation

15

## fronts analysis

### composition

The building looks like a ship from outside; Nicolosi has it defined as an “Ark of the medicine studying, overlooking the scientific landscape”. The west side is the bow, the east side is the poop. The symmetry, along the longitudinal axis, is maintained also in elevation and it is in this way visible in the east and west fronts (the short sides). Also the main entrances are symmetrical and they are recognizable by the presence of two lateral walls that are mention of the ancient architecture and that contribute to the idea of monumentality of the building. Nevertheless, the southeast front is predominant compared to the northeast. In these fronts the windows are organized according to three orders in elevation: smaller in the first lower level (where the windows are double, one above another, and they are 17); mid-sized in the second level (where there are just 4 sparse windows); larger and continue in the third level. The characteristic composition of the fronts is given by the bricks texture: the different disposition of bricks in the horizontal rows produces a shading effect, especially opposite the windows.

### relationship between empty and filled

The facades, if observed from a distance, appear massive, opaque; but they result jagged at a closer look: in this sense they have a double level of perception. The bricks themselves, thanks to their texture, give a strong perception of an alternation between empty and filled. The windows have not an intense rhythm, but they acquire a bigger depth because of their asymmetrical splay. The short sides differ once again and their openings seem to highlight the symmetry longitudinal axis.

### materials

Nicolosi chooses the travertine and peperino marbles with the aim to recall the ancient architecture since, he writes, he doesn't find, in the former contemporary architecture, a suitable language for the decoration. In this way he prefers the use of simple shapes which are enhanced by precious materials. The choice of bricks for the facades is taken just in the third hypothesis of the project; in the previous ones Nicolosi had opted for the use of stones. Great attention to detail have the wrought iron elements.<sup>1</sup>

### relationship with the plans

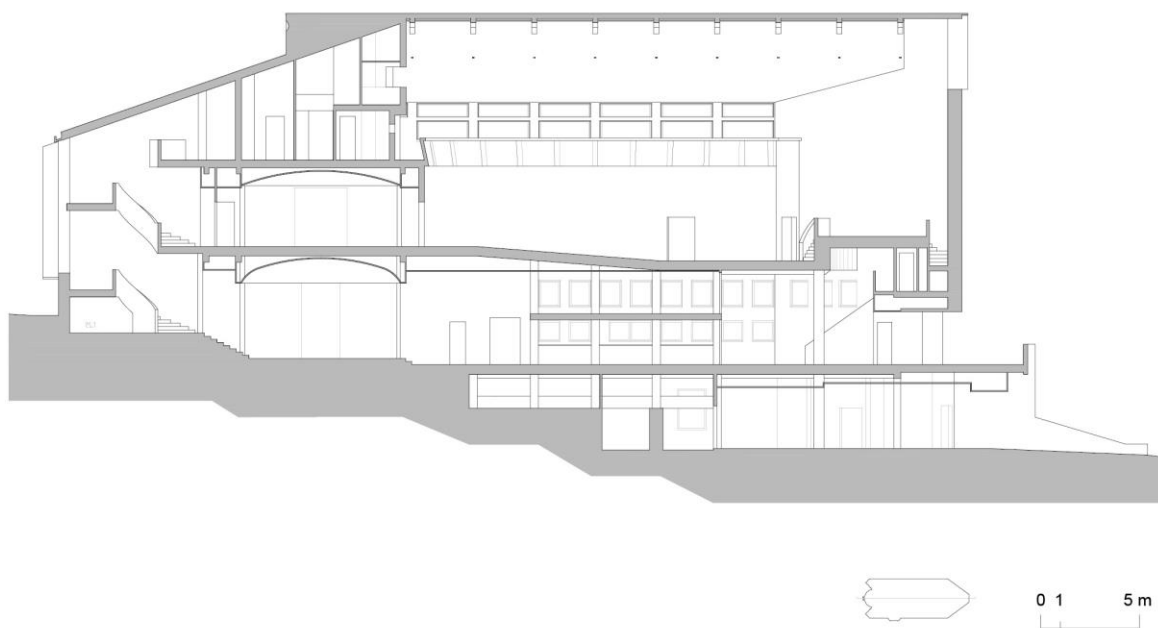
The Nicolosi aim to give expression, from outside, to the inner Great Hall is reached by the raising and the inclination of the roof realized in order to create the necessary space in the crawlspaces for the realization of the evocative suspended ceiling: it consists of a backwards double-keel hull and it represents the most characteristic space of all the building. The windows dimension and position, other than aesthetic, are functional since they always comply with the inner space they have to illuminate.

<sup>1</sup> Look at the archival investigation

Anatomical-Surgical Academy

Perugia | 1981 | 1971-1975 | Giuseppe Nicolosi

**sections**



Graphical investigation

17



0 1 5 m

## sections analysis

### the spaces: their relation and perception

As regards the relation among the spaces, as observed in the plans analysis, the Great Hall takes up the greater part of the space. In particular in the longitudinal section, it is evident the predominance of its volume in relation to the other spaces. Also in the cross-section the curve surfaces emerge, confirming their importance. In the cross-section the symmetry is evident and the three orders of the openings are readable.

As regards the perception, the spaces of the Anatomical-Surgical Academy are not simple spaces but they are characterising and representative because of the relevance of the adopted shapes and volumes. The main spaces (the Great Hall with its open gallery, the library with its loft, the elliptic lobby and the helicoidal staircase) are conceived by Nicolosi so that the observer and the user can have a total perception of the volumetric articulation.

### relationship among sections, plans and fronts

Especially for the roof profiles and for the curve surfaces, there is a strong relation and coherence among plans, fronts and section. In all of them it emerges the image of representativeness and monumentality, the regularity of the form, the symmetry, the relevance of the main spaces, the presence of curved walls, and the strong dependence of all the building to the Great Hall.



**general analysis****spaces, elements and devices closely related to the intended use and to the typology**

spaces: the Great Hall represents the main intended use of all the building and every choice made by the designer is depending on this space. In particular, a great orientation in the project definition is determined by the intention to give to the building a meaning of representativeness. These prerequisites involve a series of results in the development of the project: the shape of the spaces connected with the Great Hall and the external shape of the building, the type of materials, the position in the urban context (as a background of the complex and placed at the end of the street axis), the formal entrances, the austere atrium, the false ceiling in the Great Hall, the internal and external symmetry, the majestic external staircase, the internal elegant circular staircase and the internal marble finishing.

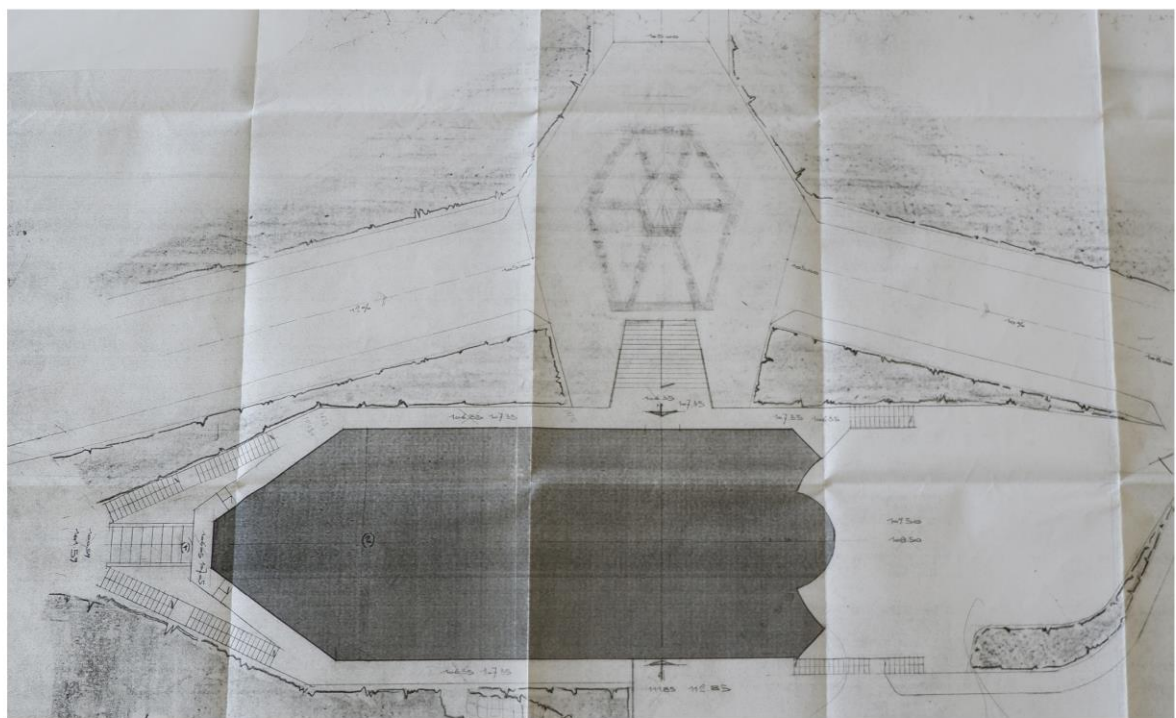
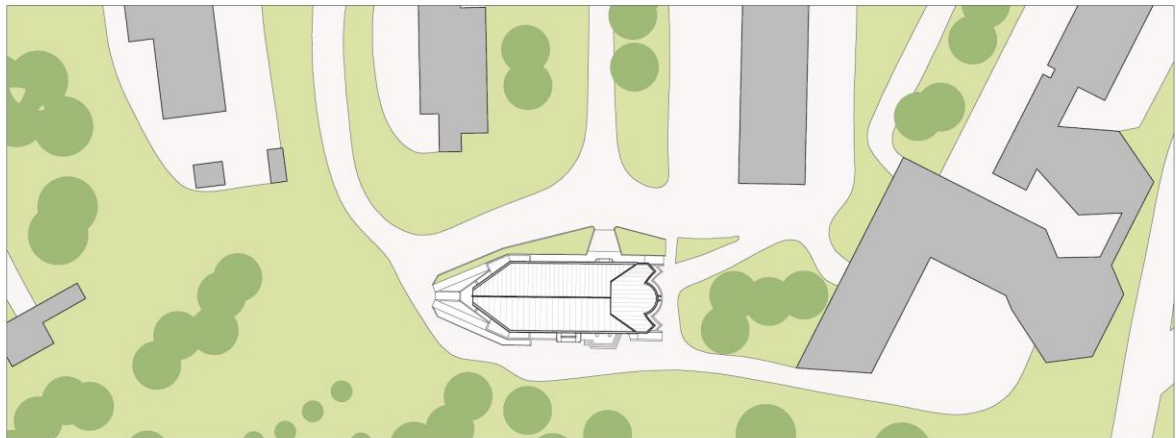
elements: the most representative elements that are strongly linked to function are the circular walls and the false ceiling of the Great Hall. The main characteristic of the circular wall is that they are structural: this means that they create not only a characteristic space, but they are also integral part of the building and they cannot be changed in the future. The structure becomes form, the function becomes aesthetic; at the basis, the designer intention is form and structure at the same time and it depends directly on the function.

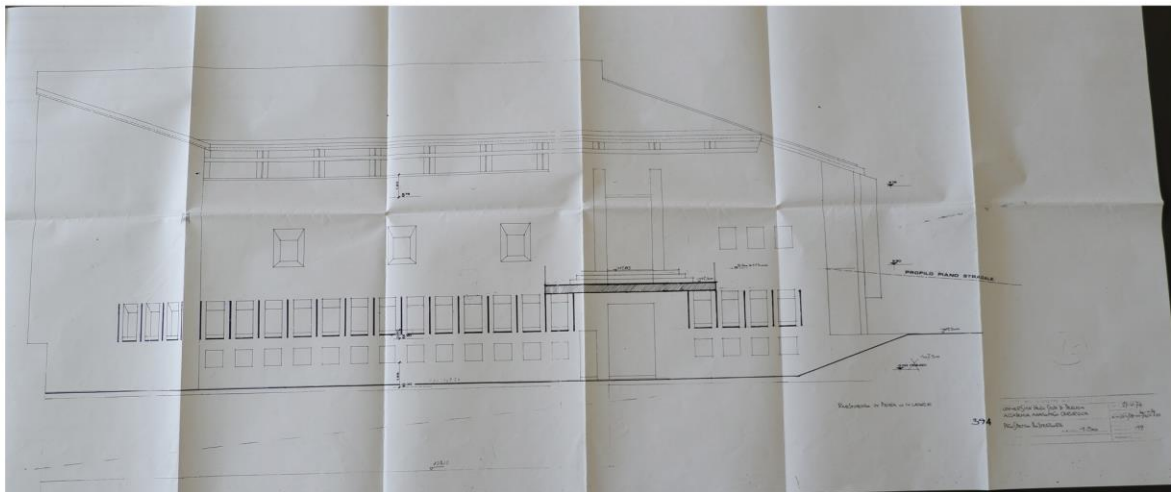
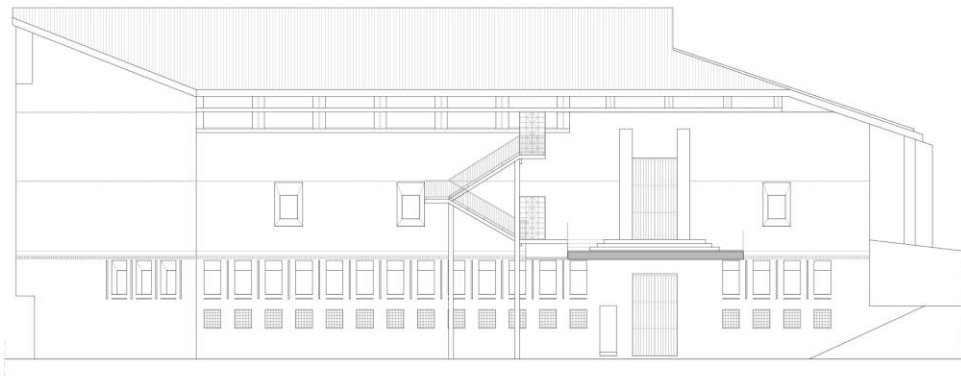
there are no devices closely related to the intended use and to the typology.

**comparison between project and architectural survey**

Between the project's drawings and the architectural survey there are no particular differences except for:

- the hexagonal place imagined in front of the main entrance and never realized that would have identified a representative space (see the next page for a graphical comparison);
- the addition of the fire escape in the northern facade that has determined the modification of a window in a balcony door and, so, the interruption of the openings rhythm (see at page 23 for a graphical comparison).

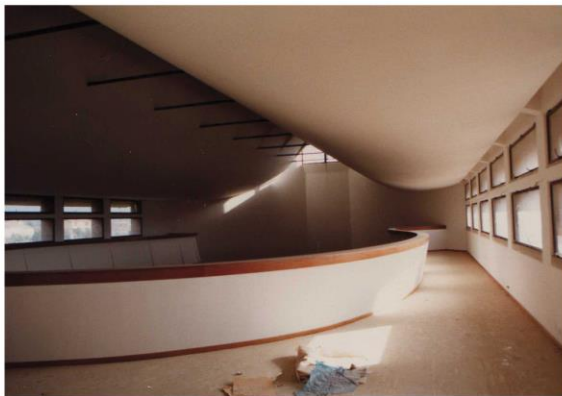




Anatomical-Surgical Academy

Perugia | 1981 | 1971-1975 | Giuseppe Nicolosi

construction photographs



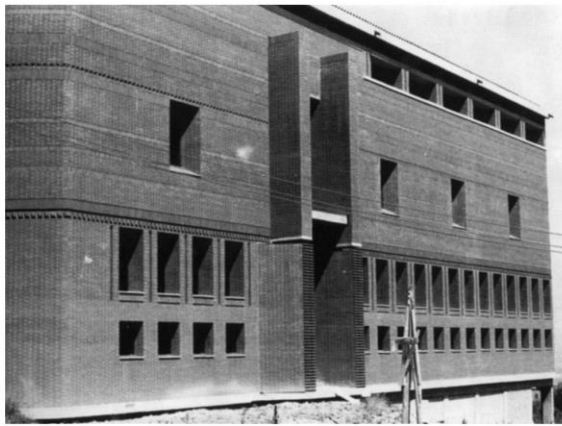
Graphical investigation

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Anatomical-Surgical Academy

Perugia | 1981 | 1971-1975 | Giuseppe Nicolosi

architectural photographs



Graphical investigation

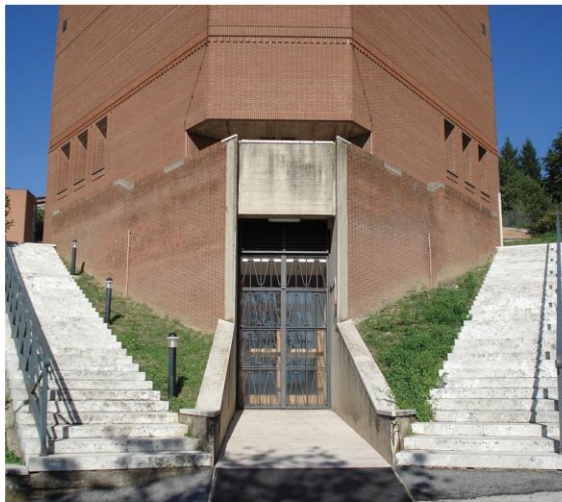
25



**Anatomical-Surgical Academy**

Perugia | 1981 | 1971-1975 | Giuseppe Nicolosi

**present photographs**



Graphical investigation

26

## sheet summary

from plans	what emerges	elements should be preserved
<b>main characteristics</b>	<ul style="list-style-type: none"> <li>- building of representativeness</li> <li>- regularity and symmetry</li> <li>- curved walls characterizing the space (anatomical shape)</li> <li>- the Great Hall as the space of utmost importance</li> </ul>	<ul style="list-style-type: none"> <li>- curved structural walls</li> <li>- Great Hall</li> </ul>
<b>fronts</b>		
<b>main characteristics</b>	<ul style="list-style-type: none"> <li>- building of representativeness</li> <li>- symmetry along the longitudinal axis</li> <li>- external outline (ship form)</li> <li>- bricks texture</li> <li>- rythm of windows in three orders</li> </ul>	<ul style="list-style-type: none"> <li>- bricks texture</li> <li>- ship shape</li> </ul>
<b>sections</b>		
<b>main characteristics</b>	<ul style="list-style-type: none"> <li>- predominance of the Great Hall</li> <li>- all the spaces depend on the Great Hall</li> <li>- image of representativeness</li> <li>- symmetry</li> </ul>	<ul style="list-style-type: none"> <li>- Great Hall</li> <li>- idea of representativeness</li> </ul>
<b>spaces</b>		
<b>main characteristics</b>	<ul style="list-style-type: none"> <li>- the Great Hall is the main intended use</li> <li>- all the spaces depend on the Great Hall</li> <li>- meaning of representativeness</li> <li>- structural and aesthetic function of the circular walls</li> </ul>	<ul style="list-style-type: none"> <li>- Great Hall</li> <li>- idea of representativeness</li> <li>- curved structural walls</li> </ul>



### Technical Investigation

materials and construction techniques

structural system

2

formal system

3

analysis of decay

types of decay

4

tests on materials

5

decay degree of severity

6

link between decay and causes of decay

7

comparison with other similar buildings made by Nicolosi

8

graphical comparison

12

**sheet summary**

13

Technical investigation

1

**materials and construction techniques\_structural system**

structure	frame system with pillars and beams (distance between pillars 2.4 m, maximum span 15 m); two masonry blocks (Great Hall walls: 30 cm; circular staircase: 43 cm), deep foundations
material of the structure	reinforced concrete (comparable to C25/30 or B300)
dimension of pillars	40x50 cm
dimension of beams	50x50 cm
prevalent spans (campata)	15 m
slabs (solai) type	hollow-core concrete with false ceilings
covering type	hipped roof (hinged beams with different dimensions, horizontal tie rods, ceiling panels)
number of floors	3 (with a double height room) and 1 basement
floor's height	4.9 m on the ground floor; between 7.4 and 11.45 m in the Great Hall

## sources:

Ing. Massimo Mariani: Verification of seismic vulnerability of the Anatomical-Surgical Academy in Perugia. General Report. University of Perugia, Perugia 2013

Ing. Carlo Brondi: Verification of seismic vulnerability of the Anatomical-Surgical Academy in Perugia. General Report. University of Perugia, Perugia 2016

**materials and construction techniques\_formal system**

vertical opaque closures	all the facades (64 cm)
	plaster (2 cm)
	internal brick wall (8 cm)
	air gap (43 cm)
	brick cladding (11 cm)
vertical transparent closures	steel fixtures, single glass, insulation (not in all the windows)
installations	-
pavements	carpet, marble, linoleum

analysis of decay

types of decay

involved area	type of decay	involved material
structure	vertical cracks	concrete
	horizontal cracks	
	fragile mechanism of central pillars	
	cave-in of the false ceiling	plasterboard
masonry	cracks	bricks

The tests made on the different parts and sides of the buildings conducted by the “UniLab Sperimentazione srl




**tests on materials**














involved area	under assessment	tests	results	
concrete structure	quality of concrete	carbonation depth	inside	outside
			medium depth 10 mm	medium depth 25 mm
	reinforcing bars	compression strenght tests	concrete comparable to C 25/30 or B300	
		tensile tests	med. value=800 N/mm <sup>2</sup>	
		ferroscan*	horizontal diameter= fi 10/fi14/fi16 mm clamps diameter=6 mm beams pace=25 mm pillars pace=15 mm concrete cover= med. value=25mm>10 mm min. value=14.44 cm max.value=64.32 cm	
masonry structure	quality of bricks and structural capacity	hardness tests (Brinell)	med. value=70 Kg/mm <sup>2</sup> material Feb44k	
		video-endoscopic investigation*	good quality of masonry	
		Karsten test**	minimal resistance=15.72 N/mm <sup>2</sup>	
	seismic performance	seismic global evaluations	performance=34%	

\* Ing. Massimo Mariani 2013

\*\* Ing Carlo Brondi 2016

decay degree of severity

light severity   
medium severity   
high severity 

area	type of decay				
	vertical cracks	horizontal cracks	fragile mechanism of central pillars	cave-in of the false ceiling	bricks cracks
south facade					
east facade					
north facade					
west facade					
interior					

<sup>1</sup>from phenolphthalein solution test  
<sup>2</sup>from the inductive, electro-magnetic measurement (trough the Würth BDM 1 instrument)

**link between decay and causes of decay**

**Types of causes:** are divided in

- planning (linked to decisions taken during the project)
- constructive (due to errors occurred during the realisation or in the implementation of the concrete mixture)
- material (due to the quality of materials)
- temporal (due to the natural decay of materials)
- maintaining (due to a lack of maintenance)
- functional (linked to the function housed in the building)
- local (linked to the geographical position and to the environmental conditions)

involved area	type of decay	probable causes	type of cause
structure	vertical cracks	seismic actions	local
	horizontal cracks		
	fragile mechanism of central pillars	seismic action natural soil cave-in low seismic performance	local planning
	cave-in of the false ceiling	seismic action	local maintaining
masonry	cricks	seismic action	local

**comparison with other similar buildings made by Nicolosi****University Great Hall and Library**

Perugia

Realization 1957

Project 1950-1957

Belardi, Paolo (eds.) 2008, pp. 165-179

Gorio, Federico 1958, pp. 15-21.

Mandolesi, Enrico 1959, pp. 30-39.

**state of preservation**

the building is still used by the University of Perugia with its original function. It has a good state of preservation, but, the tests made in 2013, have shown an high risk indicator for the Great Hall pillars.

structure	17 big concrete portals, integral each other through summit iron connections and through concrete ring beams. Dimension of the building: 40 x 12 x 17 m
material of the structure	reinforced concrete, iron
dimension of pillars	45 x 110 cm
dimension of beams	45 cm x 6,70 m
prevalent spans	3.00 m
slabs type	bricks-concrete
covering type	bricks-concrete panels, inclined pitched roof
number of floors	1 for the Great Hall, 2 for the Library
floor's height	2.80 m (basement first level); 4.65 m (basement second level); 16.90 (Great Hall)



vertical opaque closures	bricks wall (12 cm), glass wool, air space, bricks wall (12 cm), foil cladding (12 cm)
vertical transparent closures	steel, double glass, concrete lintels and portals (among wich the windows are placed) worked with chisel
installations	-
pavements	inside: Assisi pink stone, Trani white-gray stone; outside: travertine marble

**Students House**

Perugia

Realization 1959

Project 1955-1956

Belardi, Paolo (eds.) 2008, pp. 193-201

**state of preservation**

the building is still used as a student's house, together with other close buildings. It is in a good state of preservation and it hasn't suffered any modification.

structure	frame system with white pillars and beams (distance between pillars 4 m). Dimension of the building (two rectangulars) 26 x 12 m + 27 x 12 m.
material of the structure	reinforced concrete
dimension of pillars	30 x 60 cm
dimension of beams	60 cm
prevalent spans	4 m
slabs type	bricks-concrete
covering type	reinforced concrete covered by aluminium slabs
number of floors	2 basement floors + 4 above ground floors
floor's height	4 m

vertical opaque closures	bricks (8 cm), air space (6 cm), glass wool (6 cm), external brick (12 cm).
vertical transparent closures	frame in aluminium. External sunbreaks (electrically-impelled light-metal blinds)
installations	-
pavements	tiles

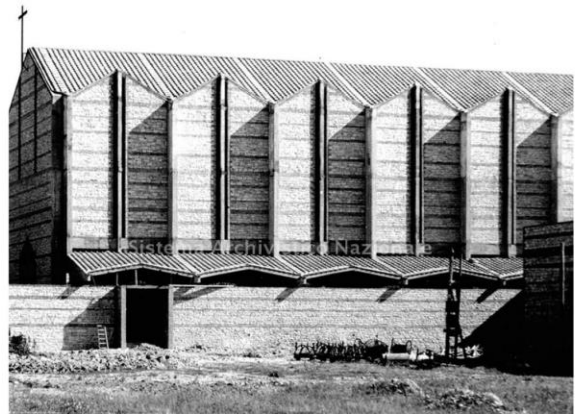
Anatomical-Surgical Academy

Perugia | 1981 | 1971-1975 | Giuseppe Nicolosi

graphical comparison



University Great Hall\_Perugia



Immacolate Conception Church\_Terni



Chemistry Department\_Perugia



Sacred Heart Church\_Spoleto

Technical investigation

12

## sheet summary

from the analysis of decay	what emerges		elements should be preserved
types of decay	<ul style="list-style-type: none"> <li>- vertical and horizontal cracks</li> <li>- fragile mechanism of central pillars</li> <li>- cave-in of the false ceiling</li> <li>- cracks in the masonry</li> </ul>		
decay degree of severity	high severity only for the cave-in of the false ceiling		
from tests on materials			
quality of materials	<ul style="list-style-type: none"> <li>- good quality and homogeneity of concrete</li> <li>- good quality of bricks and masonry</li> <li>- good resistance of the reinforcing bars</li> <li>- good conservative status of structures</li> <li>- not good seismic performance</li> </ul>		<ul style="list-style-type: none"> <li>- the false ceiling needs an intervention of maintenance</li> <li>- curved masonry walls, which are also structural</li> </ul>
link between decay and causes of decay	<ul style="list-style-type: none"> <li>- lack of maintenance</li> <li>- geographical conditions</li> </ul>	play a key role	
	<ul style="list-style-type: none"> <li>- constructive errors</li> <li>- low quality of materials</li> <li>- planning errors/ deliberate choices</li> </ul>	are not present	
comparison with other similar buildings made by Nicolosi	recurring use of concrete structure and bricks cladding, in addition to the bricks texture		the bricks texture

**The generalized sheets work**

Name of the investigated building

Place | Project year | Realization year | Designer

## Bibliographical Investigation

publications concerning the designer	page
coeval buildings belonging to the designer	page
comparison with the investigated building	page
publications of the designer	page
definition of the designer thinking	page
publications concerning the project	page
description of the building	page
publications concerning the same typology	page
publications concerning the coeval architecture	page
insertion of the building in the historical-architectural-typological context	page
oral testimonies (when possible)	page
<b>sheet summary</b>	page

Bibliographical investigation

1

**Name of the investigated building**

Place | Project year | Realization year | Designer

**publications concerning the designer**

Surname, Name: Title. Publisher, City Year

Surname, Name; Surname, Name (eds.): Title. Publisher, City Year

Surname, Name: Title, in: Surname, Name: Title. Publisher, City Year, pp.

Surname, Name: Title, in: Name of the Journal, year, number, pp.

Web references (accessed in date)

Bibliographical investigation

2



Name of the investigated building

Place | Project year | Realization year | Designer

coeval buildings belonging to the designer

**Work title**

**Keyword:**

Place

realization year

project year

publications



Write here a description of the building underlining that main characteristics which are useful for the comparison with the investigated building. Find the *Keyword* which expresses the main characteristics.

The text has to be justified and aligned at the bottom. The two text boxes on the left and on the right have to be aligned each other.

Insert one significative picture (in the empty rectangle place on the left). Every building has its own page.

Bibliographical investigation

3

Name of the investigated building

Place | Project year | Realization year | Designer

**comparison with the investigated building**

Express some ideas about the similitudes and the differences among the investigated building and the other coeval works of the architect. The text has to be synthetic in order to bring out only the main information. To this end it is also advisable making use of the **bold** or underlined characters.  
The text has to be aligned at the bottom.

Bibliographical investigation

4

**Name of the investigated building**

Place | Project year | Realization year | Designer

**publications of the designer**

Designer's Surname, Designer's Name: Title. Publisher, City Year

Designer's Surname, Designer's Name; Surname, Name (eds.): Title. Publisher, City Year

Designer's Surname, Designer's Name: Title, in: Surname, Name: Title. Publisher, City Year, pp.

Designer's Surname, Designer's Name: Title, in: Name of the Journal, year, number, pp.

Web references (accessed in date)

Bibliographical investigation

5

Name of the investigated building

Place | Project year | Realization year | Designer

**definition of the designer thinking**

Express here the emerging information about the designer thinking. The text has to be synthetic in order to bring out only the main information and organized according to the following main themes (it is possible adding other topics too):

**what and who influences the definition of his way of thinking and on which issues**

**for what is he known and stands out**

**important sentences based on his written**

It is also advisable making use of the **bold** or underlined characters.  
The text has to be aligned at the bottom.

Bibliographical investigation

6

**Name of the investigated building**

Place | Project year | Realization year | Designer

**publications concerning the project**

Surname, Name: Title. Publisher, City Year

Surname, Name; Surname, Name (eds.): Title. Publisher, City Year

Surname, Name: Title, in: Surname, Name: Title. Publisher, City Year, pp.

Surname, Name: Title, in: Name of the Journal, year, number, pp.

Web references (accessed in date)

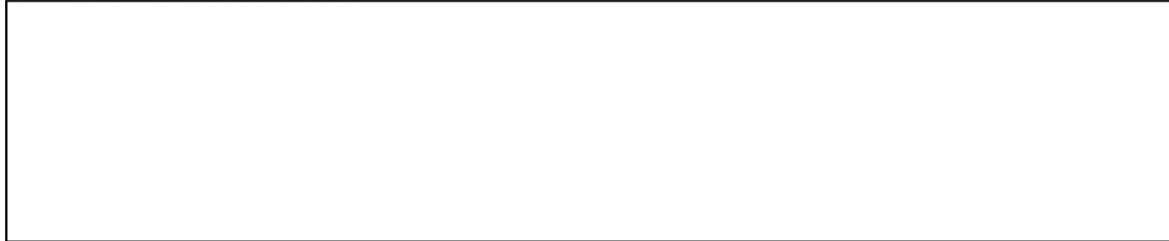
Bibliographical investigation

7

Name of the investigated building

Place | Project year | Realization year | Designer

**description of the building**



Write here a description of the investigated building, according to the information obtained by the consulted publications. You can add significant picture in the empty space above.  
It is also advisable making use of the **bold** or underlined characters.  
The text has to be aligned at the bottom.

Bibliographical investigation

8

**Name of the investigated building**

Place | Project year | Realization year | Designer

**publications concerning the same typology**

Surname, Name: Title. Publisher, City Year

Surname, Name; Surname, Name (eds.): Title. Publisher, City Year

Surname, Name: Title, in: Surname, Name: Title. Publisher, City Year, pp.

Surname, Name: Title, in: Name of the Journal, year, number, pp.

Web references (accessed in date)

Bibliographical investigation

9

**Name of the investigated building**

Place | Project year | Realization year | Designer

**publications concerning the coeval architecture**

Surname, Name: Title. Publisher, City Year

Surname, Name; Surname, Name (eds.): Title. Publisher, City Year

Surname, Name: Title, in: Surname, Name: Title. Publisher, City Year, pp.

Surname, Name: Title, in: Name of the Journal, year, number, pp.

Web references (accessed in date)

Bibliographical investigation

10



**Name of the investigated building**

Place | Project year | Realization year | Designer

**publications concerning the urban context**

Surname, Name: Title. Publisher, City Year

Surname, Name; Surname, Name (eds.): Title. Publisher, City Year

Surname, Name: Title, in: Surname, Name: Title. Publisher, City Year, pp.

Surname, Name: Title, in: Name of the Journal, year, number, pp.

Web references (accessed in date)

Bibliographical investigation

11

Name of the investigated building

Place | Project year | Realization year | Designer

**insertion of the building in the historical-architectural-typological context**



Write here information about the historical context in which the building has been built, in particular with regard to the city, and about the architectural context, not only local but also international, if it is significant. You can also add significant picture in the empty space above. Divide the text according to the following topics:

**at historical level**

**at urban level**

**at architectural level**

**at typological level**

It is also advisable making use of the **bold** or underlined characters.  
The text has to be aligned at the bottom.

Bibliographical investigation

12

**Name of the investigated building**

Place | Project year | Realization year | Designer

**oral testimonies**

Write here synthetically the useful collected testimonies resulting from interviews to:

- the designer himself (if alive)
- the designer's collaborators
- the workers in the building
- the users of the building

Indicate the significative information concernig

- the designer
- the project

The text has to be aligned at the bottom.

Bibliographical investigation

13

Name of the investigated building

Place | Project year | Realization year | Designer

## sheet summary

Fill out schematically the following table:

- in the central column with the main information which arise from the previous sections.
- in the third column, if there are, with elements, characteristics and peculiarities of the building which, or whose significance, should be preserved in the event of any transformation concerning the building itself.

	from publications concerning the designer	what emerges	elements should be preserved
the designer	main typology he deals with		
	influence by the geographical context	yes no	
	recurring materials		
	designer's label	yes no	write here the emerging elements that deserve to be preserved and turn to grey the box
	from the designer's publication		
	models	yes no	
	main innovations		
	main contributes		
	the basis of his thinking		
	oral testimonies		
the project	from publications concerning the project		
	main elements		
	from publications concerning the same typology, coeval architecture and urban context		
	important historical characteristics		
	important urban characteristics		
	architectural characteristics		
	typological characteristics		
	oral testimonies		

Bibliographical investigation

14

Name of the investigated building

Place | Project year | Realization year | Designer

**Archival Investigation**

<b>project</b>	page
all the graphics	page
analysis	page
composition	page
relationship between plan and elevation	page
comparison among the different solutions (if any)	page
<b>urban plans</b>	page
graphics	page
analysis	page
planning state of art before the project	page
Plan principles	page
restrictions and limitations	page
<b>sheet summary</b>	page

Archival investigation	1
------------------------	---

Name of the investigated building

Place | Project year | Realization year | Designer

**all the graphics**

archive and cataloging

Insert in the space defined by the box, all the drawings concerning the original project (one for each page).



date of the drawing

Archival investigation

2

Name of the investigated building

Place | Project year | Realization year | Designer

## analysis

Express ideas about the project's drawings. The text has to be synthetic in order to bring out only the main information and it has to be organized according to the following main themes:

### Composition

relationship between plan and elevation

comparison among the different solutions

It is also advisable making use of the **bold** or underlined characters.

The text has to be aligned at the bottom.

Archival investigation

3

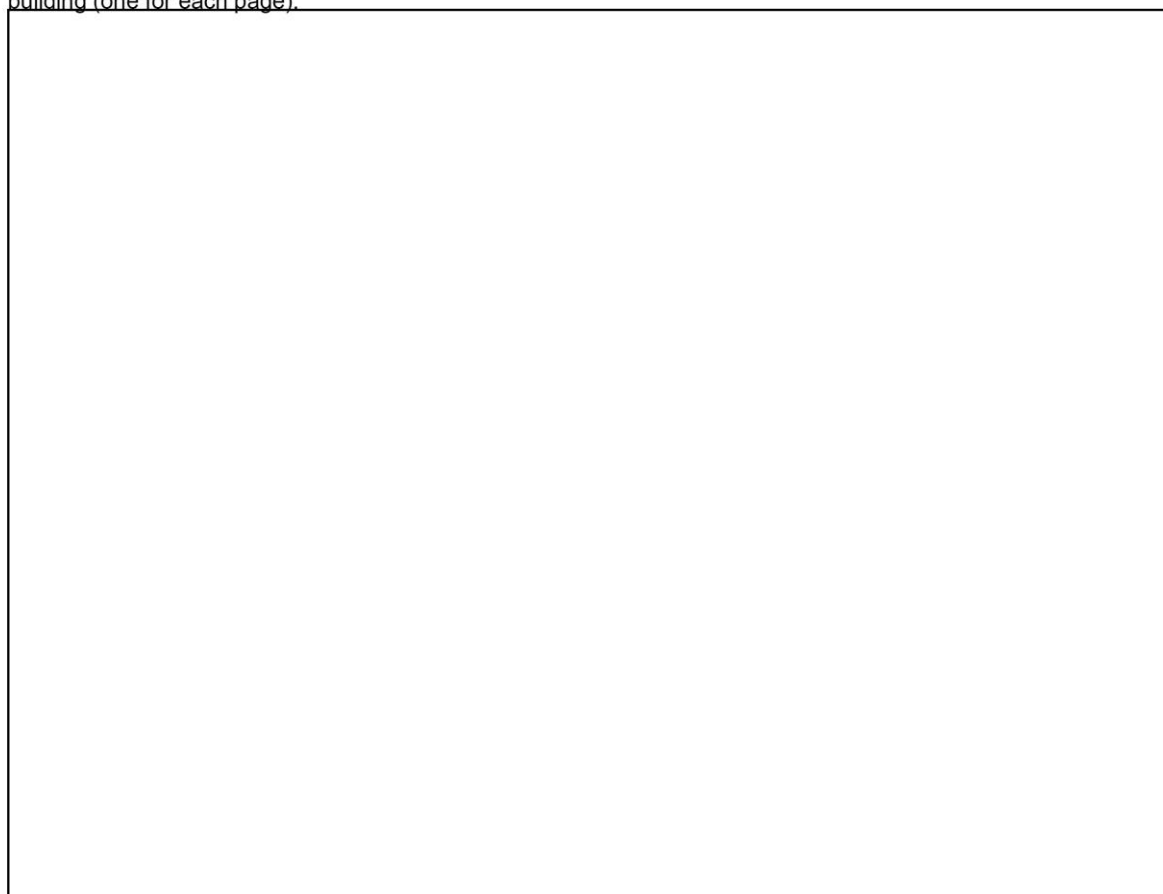
**Name of the investigated building**

Place | Project year | Realization year | Designer

**urban plans**

**graphics**

Insert in the space defined by the box, all the drawings concerning the urban plans previous or contemporary to the building (one for each page).

A large, empty rectangular box with a thin black border, intended for inserting drawings related to urban plans.

Archival investigation

4



Name of the investigated building

Place | Project year | Realization year | Designer

### **drawings analysis**

Express ideas about the urban plan. The text has to be synthetic in order to bring out only the main information and it has to be organized according to the following main themes:

#### **planning state of art before the project**

#### **Plan principles**

#### **restrictions and limitations**

It is also advisable making use of the **bold** or underlined characters.

The text has to be aligned at the bottom.

Archival investigation

5

Name of the investigated building

Place | Project year | Realization year | Designer

### sheet summary

Fill out schematically the following table:

- in the central column with the main information which arise from the previous sections.
- in the third column, if there are, with elements, characteristics and peculiarities of the building which, or whose significance, should be preserved in the event of any transformation concerning the building itself.

from the graphics	what emerges	elements should be preserved
composition		
relationship between plan and elevation		write here the emerging elements that deserve to be preserved and turn to grey the box
comparison among the solutions		
from the urban plans	what emerges	elements should be preserved
planning state of art before the project		
Plan principles		
restrictions and limitations		

Archival investigation

6

Name of the investigated building

Place | Project year | Realization year | Designer

## Graphical Investigation

### architectural survey

plans

plans analysis

planimetric composition

function of spaces

evolution of spaces and intended uses over time

fronts

fronts analysis

composition of facades

relationship between empty and filled

materials

coherence with the plans

sections

sections analysis

the spaces: their relation and their perception

coherence with the plans and the fronts

general analysis

relationship between functions and spaces

spaces, elements and devices closely related to the intended use and to the typology

comparison between project and architectural survey

### photographs

construction photographs

architecture photographs

present photographs

### sheet summary

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Graphical investigation

1

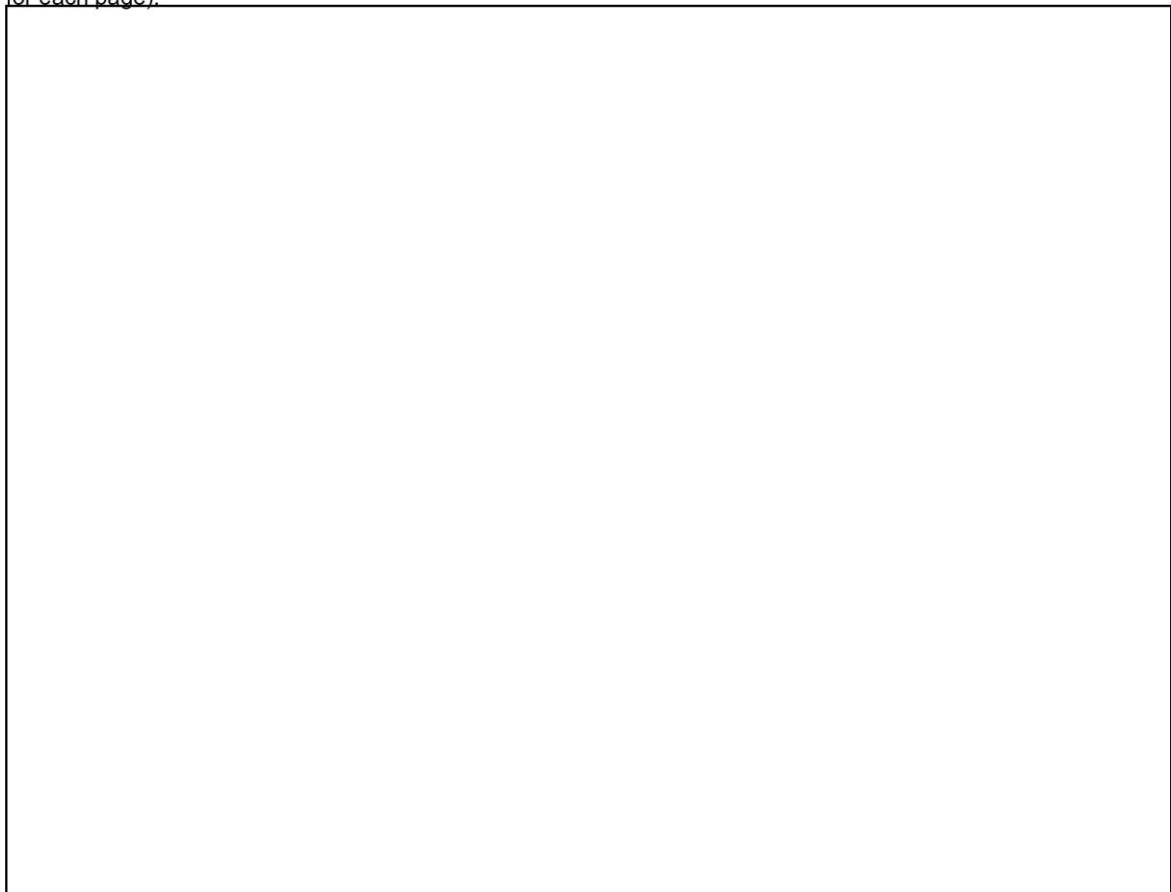
**Name of the investigated building**

Place | Project year | Realization year | Designer

**plans**

**drawing description**

Insert in the space defined by the box, all the drawings concerning the plans of the building architectural survey (one for each page).

A large, empty rectangular box with a thin black border, intended for architectural drawings. It occupies the central portion of the page below the text instructions.

Graphical investigation

2

Name of the investigated building

Place | Project year | Realization year | Designer

### **plans analysis**

Express ideas about the plans drawings. The text has to be synthetic in order to bring out only the main information and it has to be organized according to the following main themes:

**planimetric composition**

**function of spaces**

**evolution of spaces over time**

It is also advisable making use of the **bold** or underlined characters.

The text has to be aligned at the bottom.

Graphical investigation

3

**Name of the investigated building**

Place | Project year | Realization year | Designer

**fronts**

Insert in the space defined by the box, all the drawings concerning the fronts of the building architectural survey.

A large, empty rectangular box with a thin black border, intended for architectural drawings of building fronts.

Graphical investigation

4

Name of the investigated building

Place | Project year | Realization year | Designer

**fronts analysis**

Express ideas about the fronts drawings. The text has to be synthetic in order to bring out only the main information and it has to be organized according to the following main themes:

**composition**

**relationship between empty and filled**

**materials**

**relationship with the plans**

It is also advisable making use of the **bold** or underlined characters.

The text has to be aligned at the bottom.

Graphical investigation

5

**Name of the investigated building**

Place | Project year | Realization year | Designer

**sections**

Insert in the space defined by the box, all the drawings concerning the sections of the building architectural survey.

A large, empty rectangular box with a thin black border, intended for architectural drawings of building sections.

Graphical investigation

6



Name of the investigated building

Place | Project year | Realization year | Designer

### **sections analysis**

Express ideas about the sections drawings. The text has to be synthetic in order to bring out only the main information and it has to be organized according to the following main themes:

**the spaces: their relation and perception**

**relationship among sections, plans and fronts**

It is also advisable making use of the **bold** or underlined characters.

The text has to be aligned at the bottom.

Graphical investigation

7

Name of the investigated building

Place | Project year | Realization year | Designer

### **general analysis**

Express ideas about the topic of the spaces in the building. In particular according to the following theme:

#### **spaces, elements and devices closely related to the intended use and to the typology**

The text has to be synthetic in order to bring out only the main information.

It is also advisable making use of the **bold** or underlined characters.

The text has to be aligned at the bottom.

Graphical investigation

8

Name of the investigated building

Place | Project year | Realization year | Designer

### comparison between project and architectural survey

Write here, by referring to the drawings analysed in the archival investigation, the possible differences with the state observed through the architectural survey.

The text has to be synthetic in order to bring out only the main information.

It is also advisable making use of the **bold** or underlined characters.

The text has to be aligned at the bottom.

The following pages can be used for a graphical comparison between the project and the survey drawings.

Graphical investigation

9

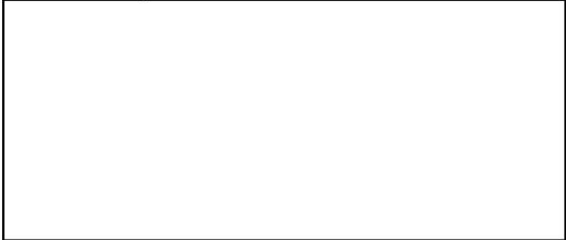
Name of the investigated building

Place | Project year | Realization year | Designer

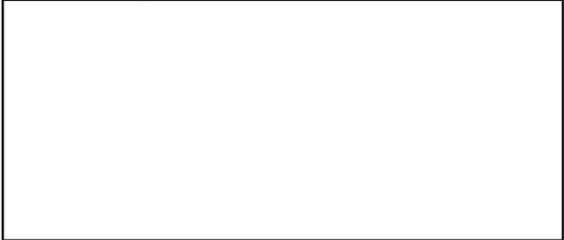
**construction photographs**

Insert in the spaces defined by the box (they can be also differently organized), pictures depicting the building during its realization.

Picture description



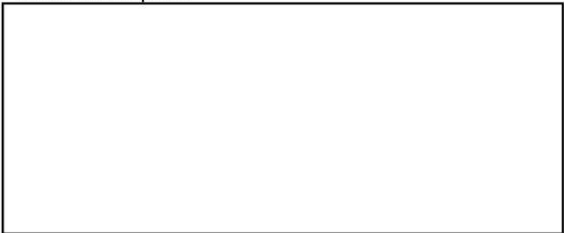
Picture description



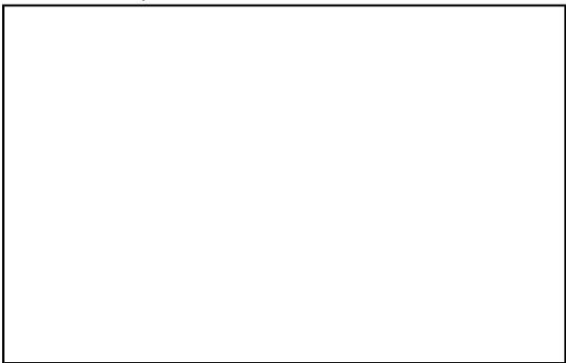
Picture description



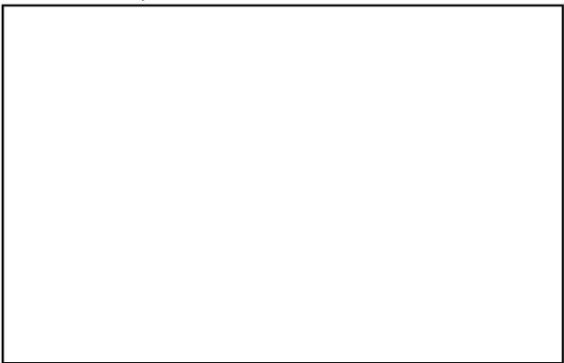
Picture description



Picture description



Picture description



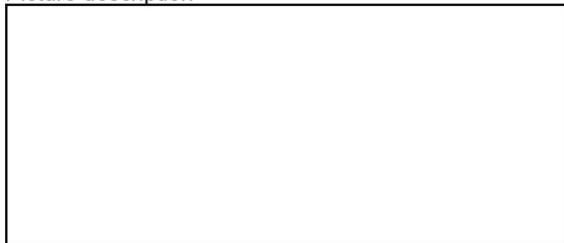
Name of the investigated building

Place | Project year | Realization year | Designer

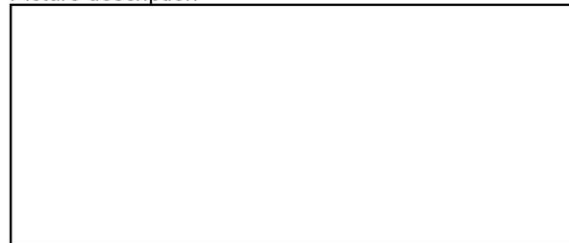
### architectural photographs

Insert in the spaces defined by the box (they can be also differently organized), pictures depicting the building right after its realization (the situation most similar to the original designer's intent).

Picture description



Picture description



Picture description



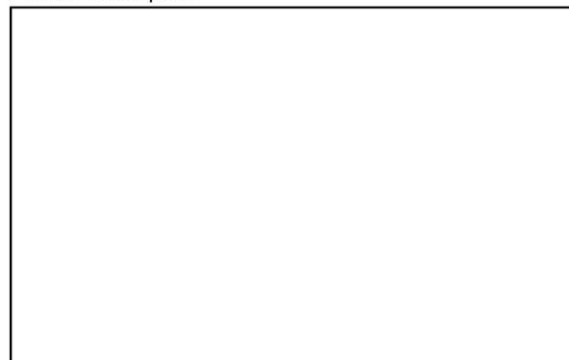
Picture description



Picture description



Picture description



Graphical investigation

11

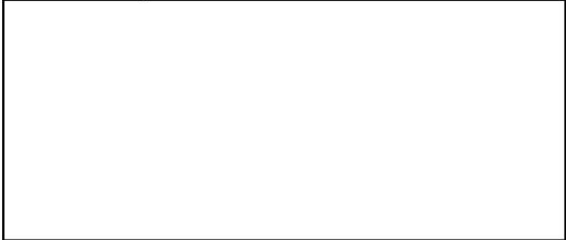
Name of the investigated building

Place | Project year | Realization year | Designer

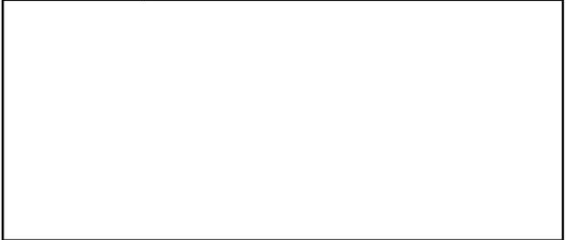
**present photographs**

Insert in the spaces defined by the box (they can be also differently organized), pictures depicting the building in the situation contemporary to the analysis. If it is necessary, considering also other significative periods during its life.

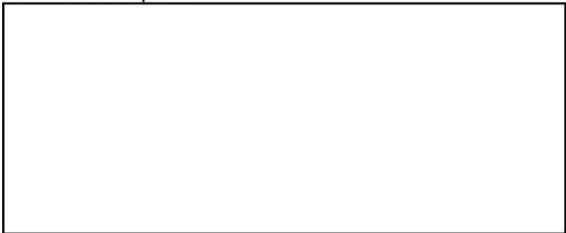
Picture description



Picture description



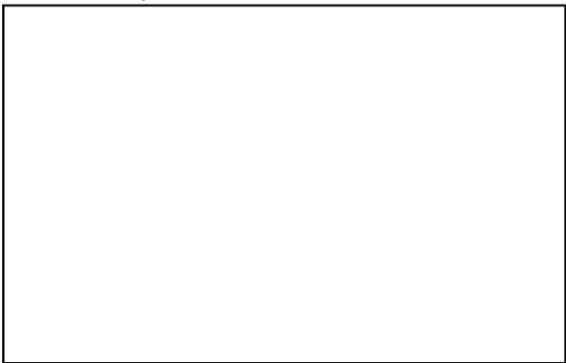
Picture description



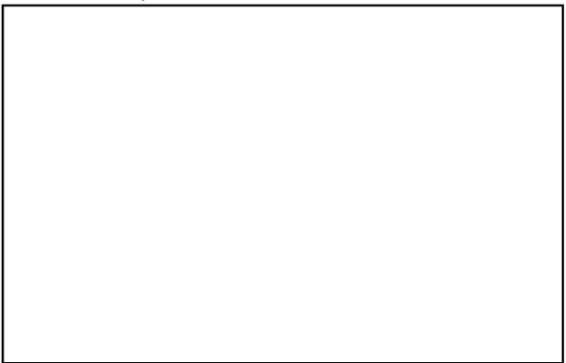
Picture description



Picture description



Picture description



Name of the investigated building

Place | Project year | Realization year | Designer

## sheet summary

Fill out schematically the following table:

- in the central column with the main information which arise from the previous sections.
- in the third column, if there are, with elements, characteristics and peculiarities of the building which, or whose significance, should be preserved in the event of any transformation concerning the building itself.

from plans	what emerges	elements should be preserved
main characteristics		write here the emerging elements that deserve to be preserved and turn to grey the box
fronts		
main characteristics		
sections		
main characteristics		
spaces		
main characteristics		

Graphical investigation

13

Name of the investigated building

Place | Project year | Realization year | Designer

### Technical Investigation

materials and construction techniques

structural system

formal system

analysis of decay

types of decay

tests on materials

decay degree of severity

link between decay and causes of decay

comparison with other similar buildings made by the designer

graphical comparison

**sheet summary**

page

page

page

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page

Technical investigation

1



Name of the investigated building

Place | Project year | Realization year | Designer

materials and construction techniques\_structural system

Describe the structural system according to the diagram below

structure	
material of the structure	
dimension of pillars	
dimension of beams	
prevalent spans	
slabs type	
covering type	
number of floors	
floor's height	

Technical investigation

2

Name of the investigated building

Place | Project year | Realization year | Designer

materials and construction techniques\_formal system

describe the formal system according to the diagram below giving information about materials, dimensions and mode of operation

vertical opaque closures	south facade (cm)	east facade (cm)	north facade (cm)	west facade (cm)
	(cm)	(cm)	(cm)	(cm)
	(cm)	(cm)	(cm)	(cm)
	(cm)	(cm)	(cm)	(cm)
	(cm)	(cm)	(cm)	(cm)
vertical transparent closures				
installations				
pavements				

Technical investigation

Name of the investigated building

Place | Project year | Realization year | Designer

types of decay

Make here in the second column a list of the types of decay observed in the building; in the first column specify the involved area of the building (if structure, masonry, windows frames etc.); in the third column specify the involved material.

involved area	type of decay	involved material

Technical investigation

Name of the investigated building

Place | Project year | Realization year | Designer

**tests on materials**

Write here what emerged from the tests on materials. Specify in the first column the involved building area (if structure, masonry, stones, etc.); in the second column the object of investigation for the tests (the quality of materials, their resistance, the carbonation depth or the concrete cover if concrete is present, etc.); in the third column write the carried out tests; in the fourth column the tests results.

involved area	under assessment	tests	results
			fill the box in green if the result of the test is good
			fill the box in yellow if the result of the test is quite good
			fill the box in red if the result of the test isn't good

Technical investigation




5

Name of the investigated building




Place | Project year | Realization year | Designer

decay degree of severity

Fill up the table with the three simbles of degree for each type of decay:

- light severity 
- medium severity 
- high severity 

Each column considers a type of decay, the row consider the four facades and the in

area	type of decay									
	type of decay 1	type of decay 2								
south facade										
east facade										
north facade										
west facade										
interior										

Name of the investigated building

Place | Project year | Realization year | Designer

### link between decay and causes of decay

Fill up this table specifying in the first column the involved area of the building; in the third column the probable causes (that can be the atmospheric agents, the carbonation for concrete, abrasive actions, etc.); in the fourth table indicating the types of causes, that are divided in:

- **planning** (linked to decisions taken during the project)
- **constructive** (due to errors occurred during the realisation or in the implementation of the concrete mixture)
- **material** (due to the quality of materials)
- **temporal** (due to the natural decay of materials)
- **maintaining** (due to a lack of maintenance)
- **functional** (linked to the function housed in the building)
- **local** (linked to the geographical position and to the environmental conditions).

Differentiating the colors of the wordings, helps to easily understand what is/are the prevailing.

involved area	type of decay	probable causes	type of cause

Technical investigation

7

Name of the investigated building

Place | Project year | Realization year | Designer

comparison with other similar buildings made by the designer

Work title

state of preservation

Write here synthetically the building state of preservation, the actual function and if it is different from the original one

Place

realization year

project year

publications

Fill up the table with the indicated characteristics. Describe here the structural system.

structure	
material of the structure	
dimension of pillars	
dimension of beams	
prevalent spans	
slabs type	
covering type	
number of floors	
floor's height	

Technical investigation

**Name of the investigated building**

Place | Project year | Realization year | Designer

describe the formal system according to the diagram below giving information about materials, dimensions and mode of operation

vertical opaque closures	
vertical transparent closures	
installations	
pavements	

Technical investigation

9



Name of the investigated building

Place | Project year | Realization year | Designer

### graphical comparison

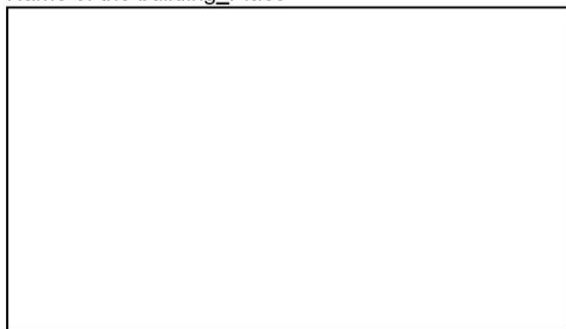
Make here a graphical comparison among different buildings of the same designer, in term of their technical characters. The comparison can concern technical details and it can be made among drawings or pictures.



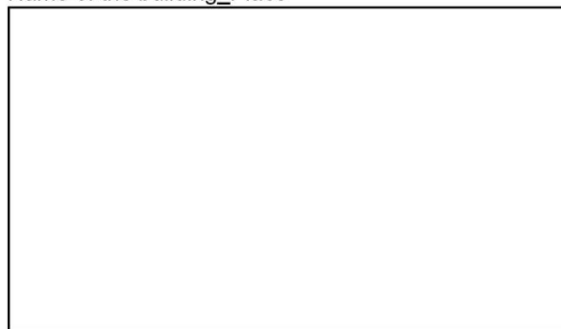
Name of the building\_Place



Name of the building\_Place



Name of the building\_Place



Name of the building\_Place

Technical investigation

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Name of the investigated building

Place | Project year | Realization year | Designer

## sheet summary

Fill out schematically the following table:

- in the central column with the main information which arise from the previous sections.
- in the third column, if there are, with elements, characteristics and peculiarities of the building which, or whose significance, should be preserved in the event of any transformation concerning the building itself.

from the analysis of decay	what emerges		elements should be preserved
types of decay			
decay degree of severity			
from tests on materials			
quality of materials			write here the emerging elements that deserve to be preserved and turn to grey the box
link between decay and causes of decay		play a key role	
		play a medium role	
		are not present	
comparison with other similar buildings made by the designer			

Technical investigation

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